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Environmental Issues

Environmental Issues

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Soviet Academician Views Global Warming, Climate Change

91WN0023A Moscow *PRIRODA* in Russian No 7, Jul 90 pp 17-24

[Article by Georgiy Sergeyevich Golitsyn, academician, director of the USSR Academy of Sciences Institute of Atmospheric Physics: "The Greenhouse Effect and Climate Change." He is a specialist in geophysical hydrodynamics, planetary atmosphere, and the theory of climate and its changes, and author of the monographs: "Introduction to the Dynamics of Planetary Atmospheres," Leningrad, 1973, and "Study of Convection With Geophysical Applications and Analogies," Moscow, 1980. He is a member of the Committee of Soviet Scientists for the Defense of Peace and Against the Nuclear Threat]

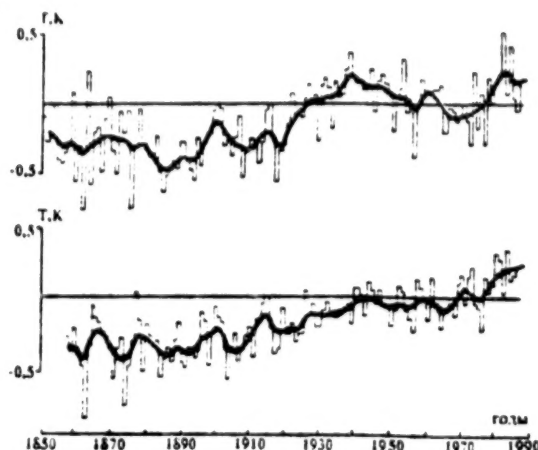
[Text] The climatic anomalies of the 1980s, primarily the unusually warm winters here in our country and in Western Europe, have attracted general attention to the problem of climate changes, their causes and consequences. For most of the last 10-20 years, the annual globally averaged temperature of the air and surface of the Earth has been the highest of the past 130 years. In many places, strong regional anomalies were noted in the form of droughts or, conversely, unusually abundant rainfalls, floods, etc. The average annual temperature over the last century has risen roughly half a degree. It is possible that this is the greatest speed of global changes in the last million years. The level of the Pacific Ocean is rising and has increased by 10-15 cm over the last 100 years. This is partly explained by its thermal expansion, and partly by the thawing of icebergs.

What awaits us in the future, and is it possible somehow to influence the course of climatic events? In order to answer these questions,¹ scientists not only are carefully studying and weighing all the factors which form climate in our time, but in their search for general laws and analogies are looking at the distant past, researching the climatic features of past epochs.

What Determines Climatic Conditions?

From the applied viewpoint, the most significant hydrologic characteristics are precipitation, moisture content of the soil, the flow of rivers, and the level of internal reservoirs. During a change of thermal conditions, the moisture content of the atmosphere also changes: A warmer atmosphere can contain more water vapor. The circulation of water in nature accelerates during warming. Evaporation and precipitation intensify, in particular. We should note that rainfalls are significantly more variable in space and time than temperature, which makes it far more difficult to ascertain their average values in space and time, even over dry land. Nonetheless, such data recently became available for the continents of the Northern Hemisphere.

[Caption: Variations in surface temperature T (relative to the conditions of 1851-1970) over dry land in the

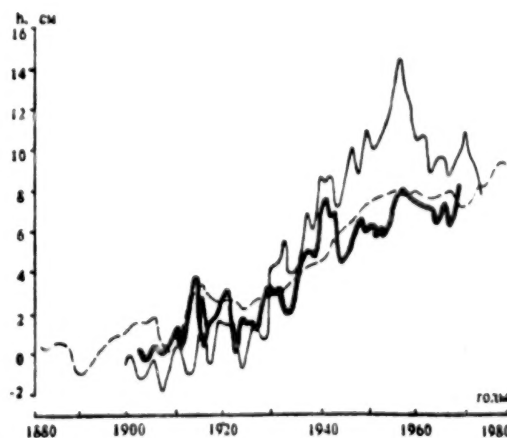


Northern (above) and Southern hemispheres with 10-year smoothing (see: Jones, P.D. *JOURNAL OF CLIMATE*, Vol 1, No 6, 1988, pp 654-660).]

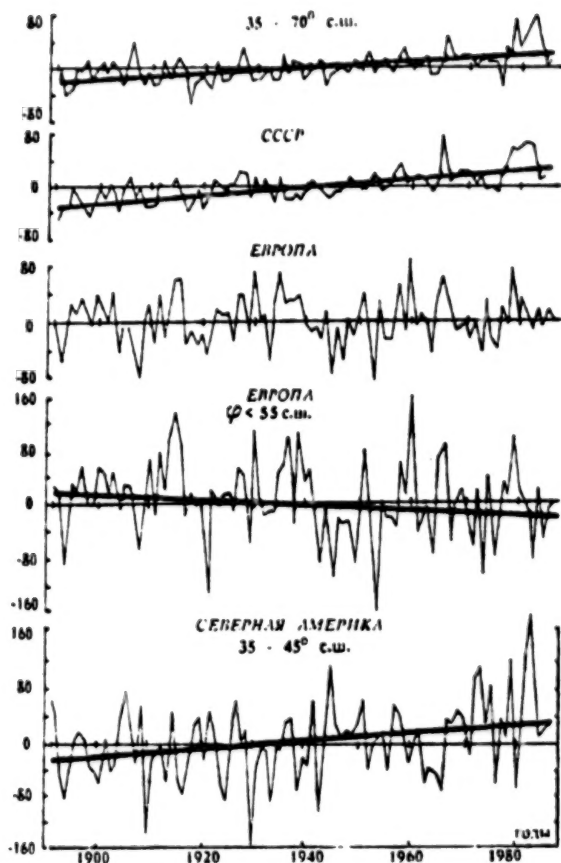
In the North European part of the USSR and Western Siberia, the quantity of precipitation increased by 9 cm over 100 years, and in the Southern and Central regions of the European part of the country—by 3 cm, in Central Asia—0.7 cm, and in Eastern Siberia—7 cm. On the whole for Eurasia, the quantity of precipitation in the period from 1891 to 1986 increased by 4 cm. Generalizing the empirical data, it is possible to claim that precipitation over the continents is growing by 10 percent with each one degree increase in temperature.

A tendency toward increased cloudiness has also been discovered. According to Soviet satellite data for 1966-1985, this process during the general warming is typical for both the Northern and Southern hemispheres. At the same time, over a number of regions of North America, Australia and Northeastern Asia, decreased cloudiness has been observed.

[Caption: Change in the average level h of the Pacific Ocean over the past century (light line, see: T.P. Barnett, *CLIMATE CHANGE*, Vol 5, No 1, 1983, pp 15-38; dark line, see: R.K. Klige, "Fluctuation in the Level of



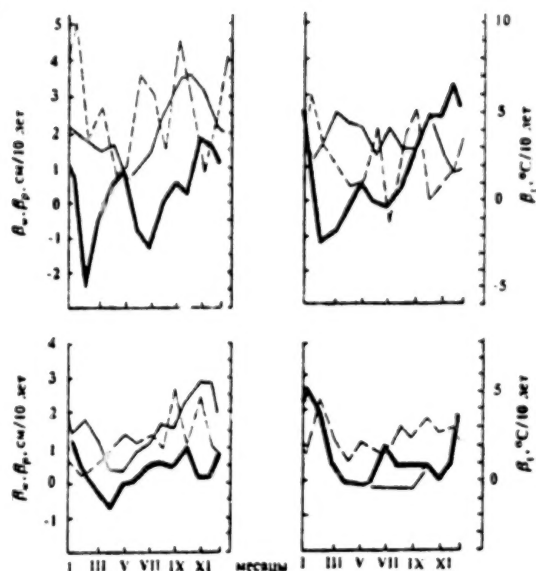
Парниковый эффект и изменение климата



Seas and Oceans over 15,000 Years," Moscow, 1982, pp 11-22; dotted line, see: V. Gornitz, et al. SCIENCE, Vol 215, 1982, pp 1611-1614)]

Moisture content in the soil, not only on the annual average, but over the growing season, plays a decisive role for agriculture. This characteristic is unusually variable and is determined, besides precipitation, by many other factors: the nature of vegetation, depth of plowing, previous crop in a plowed field, etc. Therefore, until quite recently, reliable empirical data on the moisture content of soil simply did not exist. Consistent work in this direction was begun at the State Hydrologic Institute in Leningrad. Data were chosen for 1972-1985, obtained at roughly 50 stations in preserves, i.e., places where agricultural activity did not influence the moisture content. Analysis of them showed that the moisture content in a meter-deep layer of soil has a stable tendency to increase. For the European territory of the country and Western Siberia north of 50° N (the latitude of Kharkov and Karaganda), the moisture content of the soil increased everywhere and in all seasons at a rate of 1 to 3 cm over 10 years. For Northern Asia, these changes were almost zero and statistically insignificant.

[Caption: Variations in average annual values for quantity of precipitation (in mm) for different regions



without consideration of data for Northern Canada in the zone 35-70° N (see: K.Ya. Vinnikov, et al. JOURNAL OF CLIMATE, No 7, 1990)]

The larger the territory, the less the variation in the average annual values of precipitation over it. Over small territories, rainfalls are changing very strongly. Therefore, it is hard to reveal a statistically significant trend toward an increase or decrease in rainfall. However, for large territories (USSR, 35-70° N) a clearly expressed trend toward an increase, about 5 cm over 100 years, is observed.

Let us single out two examples of such regional changes. First, there is the thawing of the permafrost in polar areas. Although for the time being it is hard to separate causes related to the global warming of the climate from local, man-made causes, especially in northern cities, it is clear that with increased warming the seasonal thaw will also increase, becoming a threat to roads, structures, and communications. Second, the level of the Caspian Sea is changing. In the 1930s, it rapidly dropped by 1.7 meters. From 1940 to 1977, it dropped another 0.7 meters. Since 1978, the level has again begun to rise, so rapidly that it had risen 1.5 m by 1989. Such variations are a serious problem for bordering regions. In the last decade this process has led to a rise in the level of ground water, the destruction of beaches, and a need to protect roads, port installations, etc. The damage already amounts to hundreds of millions of rubles.

[Caption: Estimates of linear trends—values characterizing the change in average values of the monthly moisture content of a meter-deep layer of soil B_w (dark line), the amount of atmospheric precipitation B_p (dotted line), and the surface temperature B_t (light line) for the Northwest European territory of the USSR—55-60° N (upper left), for the European territory of the USSR—50-55° N (upper right), for Western Siberia—50-55° N

N (lower left), and for Central Asia—latitudes in the 40s (lower right). (See: K.Ya. Vinnikov, et al. JOURNAL OF CLIMATE, No 7, 1990)]

In addition to the fact that we must study the change of average climatic characteristics, we must also know what is happening with climate variability: What are the frequency and intensity of extreme events (droughts, floods, hurricanes, etc.)? Analysis of 100-year series of data for global temperature or the temperature of the Northern Hemisphere has revealed a trend toward increased climate variability. This is important for the application of conclusions, since precisely droughts, floods and other extreme events cause the greatest damage.

What Past Climate Changes Show

What is the cause of the observed climate changes? Perhaps, these are simply natural fluctuations? After all, we know about the small glacial period in the 14th-18th centuries and the warm era of the Vikings in the 9th-12th centuries. We do not have instrument data at our disposal on the temperatures and precipitations for these periods, yet there are indirect ways to assume that these changes were not so global, but were to a great extent localized around the Northern Atlantic. Moreover, the rates of these changes were noticeably slower than now. Nonetheless, the absence of knowledge about the quantitative characteristics of climate variability over a period of 100 years gives numerous skeptics the opportunity for to say that we, for the time being, can say nothing precisely about the causes of the climatic changes being observed. At the same time, most scientists believe that they are related to changes in the chemical composition of the atmosphere, to an increase in the concentration of greenhouse gases: carbon dioxide gas, methane, freons, nitrous oxide, and others. We now know how the chemical composition of the atmosphere has changed over the last 160,000 years. This information was obtained by French scientists by studying the composition of air bubbles in glacial core samples, extracted from depths of up to 2 km at the Soviet "Vostok" station in Antarctica. It was discovered that in warm periods the concentrations of carbon dioxide gas and methane were higher by roughly a factor of 1.5 than they were during cold glacial periods. Swiss scientists have reached the same conclusions regarding the last 25,000 years on the basis of studying core samples of Greenland ice. For the time being, the specific mechanisms relating natural changes in atmospheric composition and climate have not been reliably established, but regardless of the nature of the cause-effect connections it is clear that they have always existed, although they also were not as substantial as now.

Some fluctuations in the parameters characterizing the climate, especially short-term (several months to two-three years), may be explained by the introduction into the atmosphere of large quantities of aerosols, above all from large volcanic eruptions. However, on a global average these changes do not exceed tenths of a degree.

Climate mechanisms related to the oceans are the least studied. Here, let us note the El Nino phenomenon—a temperature fluctuation, clearly occurring once every four-six years over the entire area of the Pacific Ocean and to a lesser extent on a global scale². Mechanisms with characteristic times in tens of years (not even to mention hundreds of years) are virtually unknown. This is the basic obstacle to the sure statement that a "signal" from the greenhouse effect has already been singled out against the background of natural fluctuations in the parameters of the climate system. Therefore, for the time being scientists prefer to limit themselves to cautious statements that the climate changes now being observed conform to what we know about the greenhouse effect³.

The Greenhouse Effect

Its essence is that greenhouse gases pass solar radiation quite well, which reaches the surface of the Earth and warms it, and they noticeably absorb the thermal radiation from the heated surface and the lower stratas of atmosphere. Part of this absorbed thermal radiation is radiated by the atmosphere back to the surface. If not for this effect, the average temperature of the Earth's surface would be 3.2 degrees C lower than today's +14 degrees C.

The main greenhouse gas in terms of significance is water vapor, followed by carbon dioxide gas CO₂, which in the 1980s ensured a 49 percent additional increase in the greenhouse effect compared to the start of the last century, then methane CH₄ (18 percent), freons (14 percent), nitrous oxide N₂O (6 percent), and other gases (13 percent). For comparison, let us cite estimates of deposits over the period from 1880 to 1980: CO₂—66 percent; CH₄—18 percent; freons—8 percent; N₂O—3 percent; other gases—8 percent. This is evidence of the rather rapid changes in the composition of the atmosphere.

The history of its evolution shows that for the first time, about 300 years ago, an increase in the concentration of methane was noted. Since the end of the 17th century, its content in the atmosphere has nearly doubled, from 0.6 to 1.7 ppm (parts per million). This process is closely related to the increase in the Earth's population, and the basic sources of methane are a direct result of human activity. This includes rice fields, large cattle herds, and the extraction of mineral fuels (coal, oil, gas).

The start of a noticeable growth in the concentration of CO₂ began in the late 18th century, when it was close to 280 ppm. At that time, this was related to the cutting of forests, which absorb carbon dioxide gas in the process of photosynthesis. At the present time, the basic source of carbon dioxide is the burning of mineral fuel. The current contribution of biological sources is estimated at 20-60 percent, although most researchers lean toward the lower limit. In 1988 the content of CO₂ in the atmosphere was about 350 ppm, i.e., it had increased by 25 percent in 200 years. At the present time, the rate of increase is almost 1.5 ppm annually.

Freons, or fluorochlorocarbons, are gases unknown in nature. They were synthesized in the 1930s and began to be broadly used in industrial production only since the late 1950s. In this brief period, their concentration in the atmosphere has reached 0.3 ppb (parts per billion).

The concentration of N_2O is also increasing noticeably. Since the end of the last century, it has increased more than 20 percent. The basic reason is the increase in the production and use of nitrogen fertilizers.

For estimating future concentrations of greenhouse gases, it is important to know not only the scenario for industrial development, i.e., for sources of these gases, but also for their removal: chemical reactions with the atmosphere, the ocean, and the biota. The science of natural biogeochemical cycles began to develop only recently. Thanks to its exceptional significance for predicting future changes in the composition of the atmosphere, this new direction has become one of the main ones in the international geo- and biosphere program, "Global Change."

The increase in the concentration of the enumerated gases has varied influences on the absorption of thermal radiation and, thus, on the increase in the greenhouse effect. This is determined by the specific absorption features for a molecule of a given gas and by the absorption spectrum of other gases, above all water vapor. The slowest increase of absorption with increased concentration occurs for carbon dioxide gas. Here, the dependency is logarithmic. For methane and nitrous oxide, the changes are more rapid: They are proportional to the square root of their concentration. For freons, the dependency is directly proportional. Although there are considerably fewer of these gases in the atmosphere than carbon dioxide, one molecule of methane is more effective than a molecule of carbon dioxide by a factor of 30, and nitrous oxide, by a factor of 10, while freons are more effective than methane by a factor of several thousand (calculated for one molecule), even though for the time being their total concentration is almost an order of four lower than that of methane.

Considering that freons do not react with anything in the troposphere and dissolve poorly in the ocean, it is not surprising that their life span is on the order of hundreds of years. Their destruction only occurs under the influence of ultraviolet solar radiation in the stratosphere, to which they slowly diffuse from lower strata. Let us note that right now the freon content of the atmosphere is increasing by 5-10 percent annually.

Freons have demonstrated especially clearly how closely all problems of the surrounding environment relate to each other and that climatic changes are only one of the aspects of the environment's overall changes. Really, it is not enough that freons make a substantial contribution to the greenhouse effect, but recently they have also acquired a sad notoriety as destroyers of ozone⁴. The burning of mineral fuels not only fills the atmosphere with carbon dioxide gas, but also puts sulfur oxides into it (coal, certain types of oil) and nitrous oxide (all types of fuel). This leads to rains which acidify soils and reservoirs and damage the forests. Roughly one-half the forests of the Northern Hemisphere to one or another extent have suffered degradation due to the influence of acid rain. The cutting of forests is decreasing the removal

of CO_2 from the atmosphere, worsens the local climate, increases soil erosion, contributes to floods, and decreases the diversity of animal and plant life. The spreading of forests, conversely, leads to reverse positive phenomena. The extreme use of nitrogen fertilizers not only raises the content of nitrous oxide in the atmosphere, but also of nitrates in our food.

However, let us return to climate changes. If the growth rates in the concentrations of greenhouse gases remain the same as in past decades, then around the year 2020 the situation will correspond to an equivalent (in the above-indicated radiation sense) doubling of the CO_2 content in the atmosphere.

Scenarios for Future Climate Changes

These are determined above all by two factors. First, by the future increase in concentrations of greenhouse gases in the atmosphere. Mankind can influence these processes, since they are determined by his economic activity (we will address this later). Second, they are determined by the reaction of the entire climatic system to this increase. Some conclusions can be drawn by studying the changes that are occurring. What the future reaction will be is a serious scientific problem, requiring the coordinated efforts of climatologists and meteorologists, oceanographers and geographers, physicists and chemists, mathematicians and biologists, hydrologists and glaciologists, specialists in space research, and many others. Work in this direction is being developed within the framework of the World-Wide Climatic Program, as well as the above-mentioned "Global Change" Program. The USSR also participates in them, although our contribution could be far greater.

The climatic system includes the atmosphere, oceans, and land surfaces with vegetation and the cryosphere. All these components have greatly different scales for temporary changes—weeks for the atmosphere, centuries for the ocean and biota, and millennia for the large ice sheets of Antarctica and Greenland. The processes within these components and their interaction with each other are the object of study.

The most widespread method for evaluating expected changes is mathematical modeling. The processes of converting solar and thermal energy, moisture, movement in the atmosphere and oceans, the interaction of the atmosphere with underlying surfaces (for instance, with the ocean or dry land) are written in the form of equations, taking into account the conditions on the borders of areas, etc. The ability to specify these processes in space and time, as well as the duration of their descriptions, depend on the possibilities of contemporary computers, for the time being still entirely inadequate, especially when it is a question of processes in the ocean. However, most of these very same processes, above all the interaction of solar and thermal radiation with the cloud cover, the formation of precipitation, and the interaction of the atmosphere with the underlying

surfaces have been little studied. All this leads to considerable variations—from 1.5 to 4.5 degrees—in the estimates for the increase in the average temperature of the Earth's surface given a doubling of the carbon dioxide content in the atmosphere. Moreover, although zonal and seasonal estimates of changes in various models conform among themselves and to the empirical data, regional changes in the models are poorly coordinated. Differences in predictions of the moisture content of soil are especially great: in some models, a strong desiccation of continents in the summer is predicted, while in others this effect virtually does not exist.

Besides the above-mentioned increase in the level of the ocean, we should also expect an increase in the frequency and strength of tropical hurricanes. They are generated above the oceans in clouds, where the temperature of surface waters is above 26-27 degrees C. During a warming, the areas occupied by such waters will be far greater. Here in the USSR, tropical hurricanes often cause strong cloudbursts and floods in the Far East, as happened in August 1989 in Primorye and Khabarovskiy Kray.

Another approach for estimating possible regional climatic changes is based on an idea of N.I. Budyko's, who proposed using information about the climates of past warm epochs: The optimum is the Holocene (6-8 thousand years ago), when the average global temperature was higher than today's by roughly 1 degree, then the preceding interglacial period (120-130 thousand years ago), when it was warmer by 1.5-2 degrees, and the Miocene (3 million years ago), when the temperature exceeded today's by 3-4 degrees. Scientists in the West, especially Great Britain, object to this, saying that other orbital parameters for the Earth (Milankovich's theory) correspond to these epochs, that the changes being recollected conform to far more balanced conditions (all changes occurred over many centuries and millennia), and that the concentrations of greenhouse gases were not as great as today (about 300 ppm and 1.5 ppm for carbon dioxide and methane, respectively, according to data from the study of air bubbles in ice core samples). Finally, reconstructions show that in tropical areas the temperatures in practice have not changed or were sometimes one degree less than today's, while models with a doubled CO₂ content also show a warming in the tropics. In addition, paleoreconstructions of all these epochs lead to more or less qualitatively similar changes in the climate not only in zonal averaging, but also for individual regions, which gives grounds to trust them in forecasting future changes. On the whole, these changes qualitatively conform to contemporary climate changes.

A great deal of work also remains both in the study of individual processes, in the numerical modeling of climate changes, as well as in refining the paleoreconstructions. For the latter, it still remains to understand the causes of warmings, especially in the Holocene and the preceding interglacial period. Most likely, in these warmer and moister epochs there was a lower albedo (the coefficient of reflection of solar radiation) for the surface

of dry land, which may be related to a high moisture content in the soil and to different types of vegetation. This hypothesis deserves more thorough verification.

Is There a Solution?

We already spoke of the connection of the climate problem to the overall problem of degradation of the environment, which inevitably takes first priority among world global problems. In 1983, the UN formed the International Commission on the Surrounding Environment and Development, chaired by G.H. Brundtland (then prime minister of Norway). The report of this commission, "Our Common Future,"⁵ can be briefly summarized as follows. Mankind has a hopeful future, if it ceases senseless extensive development which leads to the waste of natural resources, to growing pollution of the natural environment, and to an ever-greater gap in the standards of living between the wealthy North and impoverished South.

How do we achieve this? Through a sharp increase in the efficiency of using energy and raw material resources, repeated and recycled processing of so-called wastes, the creation of waste-free industries (kinds of industrial ecosystems), the transfer of energy- and resource-conserving technologies under privileged conditions to those countries which do not have them and are forced to produce output with significant expenditures of energy and raw materials. In the assessments of Western experts, expenditures for energy and resource conservation, as a rule, are repaid in several years, often in a year or two. Therefore, switching to a path of universal economy not only resolves (or weakens) the problems of the surrounding environment, including those related to climate, but is also economically profitable and eliminates inequality between generations. People have always believed that their children and grandchildren will live better than they themselves. Right now this belief has wavered seriously, and in order to restore it we must restructure the entire world economy, the socioeconomic awareness of all mankind. We have one Earth, and it needs protection from us ourselves, from our own practice of managing it. As one way to achieve this goal, for every ton of wood or mineral fuel burned in the developed countries it is proposed to impose a tax of several percent of its cost, and from this money to create a universal fund to assist developing countries in introducing resource- and energy-conserving technologies, for forest plantations, and for preventing the cutting of forests.

Let us briefly examine the potential that the world already has for this today. In 1987, 22 billion tons of CO₂ were released into the atmosphere. Of this, 45 percent was caused by the burning of coal, 40 percent—oil, and 15 percent—gas. For the production of an identical amount of energy, oil releases 15 percent, and gas 43 percent less carbon dioxide than coal. If we consider that the coefficient of useful effect for gas installations is noticeably greater than for those using coal, the benefit is greater by a factor of two-three. Of

these emissions, 23 percent are attributed to the U.S., 19 percent to the USSR, 13.5—to Western Europe, 8.7 percent—to China, and 7 percent—to East European countries. Only about 28 percent is attributed to all the others. Just replacing some types of fuels with others may noticeably decrease the release of CO₂ into the atmosphere. As everyone knows, the reserves of mineral fuel, especially oil, are limited. Therefore, they should be preserved for future generations, who may find a better application for it (for instance, in petroleum chemistry).

The efficiency of energy consumption differs considerably in different countries, calculated per unit of gross national product (GNP). In the United States, it is roughly half, and here it is almost a quarter of that in Japan and France.⁶

The Western countries first seriously studied the problem of economizing on energy since the mid-1970s, after the embargo and sharp increase in oil prices. In the United States, for instance, the consumption of energy by the basic sectors of industry (metallurgy, chemistry, the production of paper and construction materials) from 1973 to 1981 decreased by 6 percent, while their production grew by 13 percent. In the same period, Italy annually reduced the consumption of energy per unit of GNP by almost 6 percent. Similar figures are also typical for Japan. Although recently in connection with the sharp drop in oil prices this process in the economy of Western countries has slowed down, scientific and technological development work is being conducted at intensified rates.

A few examples: About 30 percent of the world's electrical power is used for illumination. The Phillips Company has been making bulbs for several years which consume less power than incandescent bulbs by a factor of 4. Although they are more expensive by a factor of 20, they operate much longer and the expense is justified after 1.5-2 years. Phosphors have been created which offer a tenfold savings in electrical power for the same amount of light! Even today, the most economical light automobiles use 3.5-5 liters of fuel per 100 km, and models are being developed for which fuel consumption per 100 km should not exceed 2.5 liters. Given the appropriate designs, it is also possible to reduce several-fold the outlays of energy for heating houses, operating refrigerators, food preparation, and so forth. Supercharged boiler cycles using aviation-type gas turbines will make it possible as a minimum to double the coefficient of useful effect for the use of fuel in stationary systems to generate electrical power and heat.

Thus, the change in the structure of industry with an orientation toward energy and resource conservation should become the general trend of development in the coming decades. This will not only improve the economy and the surrounding environment, but will also give us time to develop power engineering which utilizes renewable resources (solar energy, the wind, etc.), as well as hydrogen power engineering, in which hydrogen, not mineral fuels, will serve as the carrier of energy.

All these problems are just as urgent in our country. Their solution depends on the success of perestroika, which is called on to resolve not only political, economic and social, but also ecological problems, and not only local or regional, but global problems, such as the change of climate caused by the changed composition of the atmosphere.

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USSR, Finland Begin Joint Pollution Research in North

LD0201163191 Moscow TASS in English 1541 GMT
2 Jan 91

[by TASS correspondent Vladimir Dodonov]

[Text] Helsinki January 2 TASS—Finnish and Soviet scientists have begun to implement a large-scale joint research project to study the impact of atmospheric pollution on the vegetation of the two countries' northern areas.

The bulk of work will be done by the Academy of Finland and the Kola branch of the Soviet Academy of Sciences.

They plan to study the role of atmospheric pollution in the determination of the vegetational environment and to research into the mechanism of the impact of pollution on plants, as well as into the economic aspects of various nature conservation measures.

Until recently, environmental pollution was reckoned the only cause of the deteriorating state of the vegetation of northern areas, while the role of such factors as natural fluctuations in plant growth, climatic changes, and the impact of pests were practically ignored. This made it difficult to properly organize work to combat forest diseases, particularly in areas that are remote from pollution sources.

Scientists will focus on methods to restore vegetation in polluted zones, as the amount of harmful discharges into the atmosphere are considerably reduced.

"Soviet scientists have shown great interest in this project and stated their readiness to help implement it. I believe that we shall be able to successfully accomplish this work, which will furnish a good basis for further research and practical economic measures," Finnish Professor Erkki Haukioja, one of the directors of the project, told a news conference here today.

Greenpeace Asks France To Join Nuclear Test Ban Talks

BK0601082491 Hong Kong AFP in English 0802 GMT
6 Jan 91

[Text] Sydney, Jan 6 (AFP)—Greenpeace has sent a letter to French President Francois Mitterrand calling on

Paris to join international talks on a nuclear test ban, the environmental group said Sunday.

The letter signed by Greenpeace France President Alain Connan was delivered at 2200 GMT Saturday to the captain of a French warship escorting the Greenpeace yacht *Fand* near Mururoa Atoll, Greenpeace said in a statement received here from near Mururoa.

Fand has kept a protest vigil off the South Pacific nuclear test site since the Greenpeace flagship *Rainbow Warrior II* left the area in December.

Fand's skipper, Australian Chris Robinson, said in the statement that the letter—addressed to Mr. Mitterrand—was delivered to military personnel in an inflatable dinghy from the French warship.

The letter was delivered on the eve of a United Nations conference in New York called to discuss a comprehensive test ban treaty.

Mr. Robinson said the letter was being sent in solidarity with a large demonstration at the U.S. test site in Nevada, at which 400 people were arrested after entering the site.

Greenpeace noted that France would not be present in New York at the partial test ban amendment conference, nor was Paris a signatory to the two multilateral treaties governing nuclear testing and the spread of nuclear weapons.

The nearly two-week meeting will gather 118 signatories to the 1963 partial test ban treaty, which banned atmospheric testing. Under the treaty a third or more signatories can call an amendment conference.

Mr. Connan said Greenpeace was calling on France to immediately sign the partial test ban treaty and to work for a comprehensive test ban by supporting the New York conference.

Greenpeace further called for an immediate moratorium on testing at Mururoa and Fangataufa, for at least the period necessary for thorough and independent environmental audit of the atolls to take place, Mr. Connan said.

PRC Oceanic Fishery Protection Helps Boost Production

OW1101100391 Beijing XINHUA in English
0923 GMT 11 Jan 91

[Text] Beijing, January 11 (XINHUA)—China has taken various measures to protect and increase offshore fishery resources, it was learned here today.

The success of these measures has enabled the country to increase its aquatic products by one million tons annually over the past five years and meet the country's Seventh Five-Year Plan target three years ahead of schedule.

Zhuo Youzhan, an official from the Ministry of Agriculture, said today that China started to set limitations for the horsepower of fishing fleets in 1987 in light of the declining offshore fishing resources and the rapid increase in the number of fishing boats.

The reproduction of offshore fishing resources, which began in 1985, has yielded remarkable results, Zhuo said. The country has released 20 billion prawn larvae into the sea for breeding purposes in the past five years, ten times as many as those bred in the previous five year period from 1980 to 1985, the official said. In the meantime, 30,000 tons of mature prawns have been caught for consumption.

Meanwhile, fishing quotas have been put into effect, and 87 county level fishery administration institutions, employing over 8,000 people in the coastal areas, have been set up to supervise fishing and fishery resources protection, Zhuo said.

According to the official, China set up its first green turtle protection zone in Guangdong Province in 1986. The zone, a protected breeding area, has enabled the area's over 400 turtles, from 1985, to increase their numbers to the current population of 30,000. The effort has been highly praised by the international community.

To better supervise offshore fishing, China has made use of some modern facilities, such as satellite communications and radar systems. In addition, more than 20 supervising stations have been set up nationwide to watch for the environmental changes in the major fishing areas, the official said.

PRC Official on Principles for Solving Environmental Problems

OW1501213491 Beijing XINHUA in English
1548 GMT 15 Jan 91

[Text] Beijing, January 15 (XINHUA)—A Chinese official in charge of environmental protection said today that in international environmental protection affairs, China is willing to take on reasonable international duties and seek ways to solve this global issue through wide international cooperation.

Li Xue, deputy director of the Environmental Protection Commission of the State Council, gave these remarks at a seminar on climate changes and environmental protection, which began here today.

He said that in order to solve the global environmental problems that are in the common interests of mankind and all developing countries, the following principles should be followed:

—Correctly handling the relations between environmental protection and development. This principle applies especially to the developing countries, which can only deal with the environment issue as a part of their economic development.

- Making it clear who should bear the most responsibilities in the global environmental issues. The developed countries prospered only after having used the world's resources for a long time free of charge. In this sense, they should take on a greater share of the responsibility in solving the problem.
- Maintaining the sovereignty of each country over its resources. The sovereignty of each developing country over the development and use of its natural resources can not be violated, and that one country cannot interfere with the internal affairs of another in the name of environmental protection.
- Strengthening the wide participation of developing countries in the issue. Now that most of the developing countries face the double pressure of both environmental protection and economic development, they pay more attention to the environmental issue. Necessary measures are needed to ensure the participation of developing countries in international environmental affairs.
- Taking into full account the special needs and conditions of the developing countries. These countries encounter problems ranging from ecological deterioration, shortages of funds, backward technology, and population growth, to environmental pollution and resource shortages resulting from industrial development.
- Environmental protection should not be used as an additional condition for economic aid and as an excuse for new trade barriers.
- The developed countries have the responsibility to provide ample supplies of money to help the developing countries protect the environment, or make up for the losses that result from their environmental protection efforts.
- Strengthening the creation of an international law governing the environmental issue.

In the meantime, Li put forward some other suggestions regarding global climate changes, the protection of the ozone layer, the protection of the biological species, the transfer of harmful wastes, and marine pollution.

He said that the universal and most serious ecological environmental problems facing the developing countries would no doubt negatively affect the steady development of the world economy. Therefore, he said, solving these

problems should be no less important than other global issues calling for the full attention and support of the international community.

Li said that the United Nations environment and development congress scheduled for June, 1992, will be of vital importance to the interests of the developing countries, and may be an important occasion leading to changes in the present state of international relations. It will also revitalize the South-North dialogue and open up new fields for the South-South cooperations, the official said.

Li called for more consultation, coordination and cooperation among the developing countries in the world's environment affairs.

According to the official, the ministers of environment affairs from some developing countries will meet here in June this year to discuss ways to solve environmental problems and goals for the UN environment and development congress.

International Environment Protection Exhibit To Open 30 Jan in Taiwan

*OW1201040991 Taipei CNA in English 0256 GMT
12 Jan 91*

[Text] Taipei, Jan. 12 (CNA)—An international exhibition on environmental protection will open here later this month.

The International Environmental Control and Protection Technology Exhibition and Conference (Enprotech '91), sponsored by the Netherlands Council for Trade Promotion (NCH), will be held at the Taipei World Trade Center from January 30 to February 2.

An NCH spokesman said that the exhibition will focus on wastewater, air pollution, solid waste, soil waste, and noise control technologies. More than 240 companies from the Republic of China and other countries, including such big names as Dupont, ICI, and Philips, are expected to take part in the exhibition.

In addition to companies from the private sector, nine countries in their own pavilions will demonstrate their environmental protection achievements. They are the United States, Canada, Holland, Great Britain, France, Austria, Australia, Finland, and the Republic of China.

The spokesman said this is the second time NCH has sponsored such an exhibition; the first took place in 1989. NCH hopes to introduce state-of-the-art technology and to help participants cooperate in improving environmental protection technologies, he added.

BOTSWANA

Okavango Residents Concerned Over Delta Dredging Plan

MB1101203891 Windhoek Domestic Service in English
1900 GMT 11 Jan 91

[Text] Residents of the Okavango River Delta in Botswana have expressed their opposition to a government plan to dredge part of the river in order to provide water for a diamond mine.

Conservationist (Paul Shearer) said despite the opposition, the scheme should probably go ahead, with work starting on Tuesday [15 Jan].

(Shearer) met Botswana Water Affairs Minister Archie Mogwe yesterday in a bid to stop the 20-million-rands project. The scheme is meant to increase the reliability of the water supply to the De Beers diamond mine at Orapa, and will affect at least 70 square km of the Okavango River Delta.

MADAGASCAR

Canada To Mine Ilmenite at Cost of Forest Zone

91WN0186A Johannesburg ENGINEERING NEWS
in English 14 Dec 90 p 5

[Text] Conclusions of an environmental impact study of a project to extract ilmenite at Taolagnaro were published at Mangasoavina, Madagascar, on 13 November.

Overseas reports state that the ores mined will be sands containing ilmenite, rutile, zircon and monazite, at the Mandena, Petriky and Taolagnaro sites.

The project will, however, require the destruction of 75 percent of a 4,000 ha coastal forest zone.

This project will be a joint venture linking the Office Militaire National pour les Industries Strategiques (Omnis) and Canadian company Qit Fer et Titane Inc.

The ilmenite production potential is estimated at 725,000 tons a year for 40 years.

According to the report the project is expected to generate foreign currency income of some \$20-million a year for the 40-year period, and will directly provide 550 jobs.

Investments required are set at about \$300 million. According to World Bank stipulation—the institution funding the impact study—it is now time to decide on how to limit the side-effects of the project on the environment.

The Canadian company's vice-president Raymond Saucy, has proposed the establishment of special conservation zones as it will be, in his view, impossible to preserve the whole forest area as this would excessively reduce remaining resources to be extracted.

MAURITIUS

Warmer Temperatures Result of Industrialization

91WN0140A Port Louis LE MILITANT MAGAZINE
in French 10-11 Nov 90 p 13

[Text] "It is definitely much warmer in Port Louis than before," Mr. Sok Appadu stated categorically as he announced that a climatic study based only on the capital would be conducted in the near future.

According to the assistant weather director, the temperature rise in the capital is the result of increased industrialization and the construction of an increasing number of buildings. According to Mr. Sok Appadu, another factor responsible for the considerable rise in temperatures is the lack of green space.

However, Mr. Sok Appadu does not believe that industrialization has had any impact on the climate of the country in general. "We have the good fortune to be swept by tradewinds during almost the entire year. This wind that blows from the southeast pushes the pollutants towards the ocean," Mr. Sok Appadu said, while also pointing out that there is very little industry in the southeastern part of the country.

Mr. Sok Appadu noted that the climate in Mauritius in general depends on the world climate.

MOZAMBIQUE

Nampula Facing Imminent Deforestation

91AF0382E Maputo NOTICIAS in Portuguese
22 Nov 90 p 3

[Text] The vegetation in the province of Nampula faces total extinction, just as is occurring in the other provinces of this country. This situation results primarily from a disrespect for the laws and rules that regulate the use and exploitation of the forest resources. This was the report given recently by Maria Naftal, chief of the Forestry and Wildlife Services in Nampula, during the first National Seminar on the Environment, which was held in that northern city.

According to the account given by Naftal on that occasion, about 5,000 hectares of forest are being cut down in different zones of the province without proper reforestation or replacement of the trees. Nor is any natural regeneration of the forests recurring, since the "cap" itself is later burned for the sake of farming activities.

In addition to the practice of felling trees and other shrubs and plants, there is uncontrolled burning, mainly for agricultural reasons, as well as both poaching and traditional hunting activities.

Naftal mentioned districts that have high population density—namely Nacala-Porto, Monapo, Ribaue, Angoche, and Nampula—as being the ones that exhibit

the greatest degree of destruction. Things have reached such a point that their residents have to travel long distances to find firewood.

"In some of those districts—such as Angoche, Ribaue, and Monapo—the destruction is so massive that it even leads to problems associated with the drying up of the rivers and aggravates the constant shortage of rainfall, as well as the illnesses caused by shortages of drinking water, oxygen, and other elements necessary to human life," she said.

Our source said that an evaluation of agricultural production in the region was made recently, in order to compare it with the level of five years ago. It was concluded that output is declining significantly because of uncontrolled deforestation. In this context, Naftal indicated that the government has already lost some of its largest forest preserves.

She also said that 11.4 million hectares, or 16 percent, represents forest that has some commercial value. "The exploratory inventory taken by the FAO in 1980 showed that about 89 percent of the country was covered by woody vegetation, composed of trees and bushes. Of that, 45 percent consisted of savannahs of low density, and 39 percent was shrubby vegetation.

What Are the Solutions?

Every possible effort will need to be made to stem the massive destruction of the forests. Work must be done to reforest the zones where the trees are being cut, and to preserve and properly manage the existing forestry resources.

This is why Project FO-5 is being implemented in Nampula Province. The following are among the principal project activities:

- Planting of fast-growing trees having low commercial value, with a view to producing coal and firewood for the inhabitants of the cities of Nacala and Nampula.
- Planting trees to protect the hydrological basin and the shallow lake that provide water for the city of Nampula. About 1,300 hectares of eucalyptus have already been planted under this project.

In addition, various trials are being done with leguminous and leafy species, as well as experiments in agrosylviculture, with a view to improving the ability to meet the continuing needs of nature conservation.

NIGERIA

Scientists Underscore Environmental Contamination Dangers

91WN0168A Lagos *THE GUARDIAN in English*
28 Nov 90 p 3

[Article by Akin Jimoh]

[Text] Despite her low level of industrialisation, Nigeria's level of environmental pollution ranks among the worst in the world.

This was the view yesterday of environmental scientists at a 2-day seminar on "Health promotion and disease prevention in industries and their neighbouring communities" at the Ogun State Teaching Hospital (OSUTH), Sagamu.

Besides, they warned that unless the government, private entrepreneurs and the public made deliberate efforts to stem the trend, the country could be walking into a gradual ecological disaster.

Calling for a balance of inter-relationship between man and the environment, Dr. Ayodele Oni, the Ogun State director of Disease Control and Environmental Health, identified environmental contamination—in the form of air, food, water, toxic waste, noise and radiation—as a source of danger to human health, besides exerting imbalance in the ecological system.

He, therefore, blamed environmental pollution on our over-dependence on industrial growth for economic development, with its over-emphasis on profit, adding that this militated against deliberate efforts to prevent environmental deterioration.

Dr. Oni also blamed the extent of the country's pollution on the hazardous and indiscriminate dumping of industrial waste and effluents by industries, citing Lagos, Port-Harcourt, Warri and Kaduna as hardest hit by the trend.

He, therefore, stressed the need for a proper management of all toxic wastes, involving not only the government but the entire populace and praised the government for setting up the Federal Environmental Protection Agency (FEPA).

Dr. Akin Osibogun of the school's Department of Community Medicine and Primary Care, listed several occupational hazards, noting that epidemiological investigation had confirmed the infection of many specific diseases to the level of the victim's exposure to certain toxic substances.

According to him, the ecological effect is far reaching, especially on the 70 to 80 percent of the rural populace, who are farmers.

Citing cancer as the most debilitating of the diseases arising from environmental toxicants, Dr. Victor Odunlami of the same department noted that studies on occupational groups have revealed:

—a close relationship between asbestos films and lung and gastro-intestinal cancer, diffuse pulmonary fibrosis, bronchial carcinoma and cancer of the pleura, peritoneum and the larynx;

- that dye workers, who are exposed to certain chemicals, such as aniline dyes, are likely to develop cancer of the bladder;
- that cancer of the bladder is common in areas where schistosoma naematobrium is endemic as shown by studies on fishermen in Epe, Lagos State; and
- workers who handle radioactive substances run the risk of skin cancer as well as farmers who use pesticides.

SOUTH AFRICA

Government To Extend Ban on Ivory Imports, Exports

MB0201113591 Johannesburg SAPA in English
1058 GMT 2 Jan 91

[Text] Pretoria Jan 2 SAPA—South Africa will maintain the moratorium on the import and export of ivory for commercial purposes, National Education and Environment Affairs Minister Louis Pienaar announced on Wednesday [2 January].

A one-year prohibition placed by the SA [South African] Government on the import and export of ivory on 25 October, 1989, terminated on December 31, 1990. Mr. Pienaar decided to extend it "with a view to further negotiations" with the parties of the Conference of Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Cites).

At the seventh Cites conference held in October 1989 in Switzerland, the African elephant was transferred from Appendix II to Appendix I of the convention. This resolution implied that no international trade in elephant and elephant products could take place as from January, 1990.

"The South African Government, however, entered a reservation against this resolution, which means that as far as South Africa is concerned, the African elephant is still in Appendix II," said Mr. Pienaar in a statement.

The one-year prohibition on the import and export of ivory was placed to show a solidarity with the spirit of the convention.

National Environmental Consciousness Forming

91WN0184A Johannesburg THE WEEKLY MAIL
in English 10 Jan 91 p 16

[Article by Eddie Koch: "Green Politics Straddles Class Divides"]

[Text] One wintry morning this year, the youth went out onto Alexandra's streets to clean-up the refuse, excrement, garbage, rubble, plastic bags, scrap metal, wrecked cars, dead dogs and other detritus that litters the township.

Last year the string of green groups that sprouted across the land were, in the main, confined to middle class circles and the only example of community-based organisation around the environment to be found existed at Mmafele, a village in the Northern Transvaal afflicted by abandoned dumps of deadly blue asbestos.

But the clean-up campaign by the young militants of Alexandra, a band more accustomed to marching in the streets than cleaning them up, marked a new development: environmental awareness had, by the end of 1990, filtered into the consciousness of ordinary men and women from scattered and diverse communities in South Africa.

Take the township of Zamdela. It was built downwind of the Sasolburg industrial complex so that white suburbs in the area could be spared the full blast of soot, carbon dioxide, nitric gases and other noxious matter that spews from Sasol's outdated oil-from-coal plant, the largest coal-burning power station in Africa at Lethaba and a collection of nearby foundries and chemical factories.

"When I first arrived in Sasolburg it was three in the morning. It was beautiful, all those lights. I thought I was in heaven," factory worker Tladinyane Kgodumo told a crew filming the effects of urban pollution in the Transvaal.

"Now, after all these years, it seems more like hell. Workers in these factories are fighting a constant struggle for better health and safety regulations. They work all the time with dangerous chemicals and there are many accidents.

"But it is not only the factory workers who suffer from working with these chemicals. What about the people who live in Zamdela, right next door to the factories? We are all suffering from pollution these factories have been putting into the air."

Today Kgodumo and his compatriots in the South African Chemical Workers' Union, an affiliate of the National Council of Trade Unions, are active members of a small and struggling environmental pressure group in the township.

It is planning a survey of air pollution, its extent and its effects on people's health, as the first stage of a campaign to put pressure on local industry into improving their living conditions. In Namaqualand, a remote and overlooked wedge of territory between the Western Cape and Namibia, farmers and pastoralists waged some vivid environmental struggles.

The Namakwaklandse Burgersvereniging (civic association) organised protests by people from Komagass, a town that most South Africans have never heard of, against plans by Eskom to acquire the site for a nuclear power station.

More than 100km away, in the town of Springbok, some 6,000 people marched across a desert landscape under the colours of the African National Congress [ANC] to

demonstrate against the proposed construction of a toxic waste recycling plant at nearby Alexander Bay.

The people of the Richtersveld won the right to use traditional grazing lands in an area that had been proclaimed as a game reserve. During their struggle, they received a message of solidarity from the Pitjantjatjara people of the Uluru-Katajuta National Park at Ayers Rock in Australia, one of the few communally run nature reserves in the world.

Earthlife Africa is currently working with left-wing civic organisations as well as the more established (and discredited in the eyes of activists) community council of Azaadville, an Indian township near Krugersdorp. The project is to oppose a scheme by local businessman Benoni van Graan to build a disposal site nearby for toxic waste.

The people of Azaadville appear to be so aghast at having to live next to a dump of poison that they are trying to mend the township's internal political tensions and have even made tentative approaches to the right-wing Conservative Party, whose members in the white suburbs of Krugersdorp are also against the dump.

White ratepayers, not renowned for their militancy, mobilised themselves in a little Indian Ocean resort near Cape Town called Rooi Els to protest against the activities of a subsidiary of Armscor called Somchem. The company was testing rocket propellants on a nearby test range that sent large clouds of dust and chemicals into the air above the local dam, creating fear among the residents that their water supplies were being contaminated.

Another show of united action between diverse groups was staged in mid-1990 when the ultra-militant Food and Allied Workers' Union (Fawu) joined forces with Earthlife's Cape Town branch and the Dolphin Action and Protection Group to protest against the activities of Taiwanese fishing trawlers accused of stripmining South African waters with illegal gillnets.

Fawu was prompted to join the protests by revelations that at least four South African workers employed on the trawlers had to have their fingers amputated because of gangrene and frost-bite caused by working without adequate protective clothing in sub-zero temperatures of the ships refrigerated holds for shifts of up to 11 hours.

In the Maputaland district of Northern Natal, an environmentally unique region that runs along the southern border of Mozambique, resistance to the kwaZulu government's conservation policies dominated local politics this year.

Late in 1989 a dozen informal leaders from the area met the Congress of Traditional Leaders of South Africa (Contralesa), an alliance of traditional chiefs who align themselves with the ANC, to discuss their problems.

Three months later a delegation of tribal elders organised a movement called "Isididi" to mobilise against the

proclamation of a nature reserve at Kosi Bay and the restrictions that conservation measures were imposing on communal lifestyles. Isididi is the isi-Thonga word for communal huts in which the village's harvest is stored.

To highlight the way local conservation policies were undermining subsistence farming, students from a school near Kosi Bay workshopped a play and staged it at schools in the Durban area. The performances were cancelled when kwaZulu's Bureau for Natural Resources lodged strenuous objections with the local education authorities about the drama.

Just before Christmas in 1990, a community of a different kind won a small green victory. South Africa's many thousand smokers of dagga, regarded by many as a traditional herb, breathed more easily when Minister of Law and Order Adriaan Vlok agreed to suspend a programme aimed at wiping out the nation's cannabis crop by spraying it from the air with a deadly defoliant called Paraquat.

Vlok made this decision after holding talks with Earthlife Africa's Southern Natal branch and the South African Rivers Association, who claimed the government was waging "chemical warfare" on rural villagers who live near the dagga plantations.

Ratepayers from plush seaside resorts; nomadic pastoralists in the Northern Cape; township residents faced with a toxic waste dump on their boundaries; factory workers in polluted industrial townships; impoverished scholars from villages threatened by a game reserve; labourers on trawlers that stripmine the ocean with gill nets; struggles by this motley assortment of communities provided the novel feature of green politics in South Africa this year.

Earthlife representative Chris Albertyn summed up their significance when he said: "It seems that diverse groups of people who are opposed to each other on other issues are prepared to work together to save the environment. This is a force for conciliation, unity and peace in South Africa."

Pollution Along Cape Coast Termed 'Alarming'

91WN0172B Johannesburg *THE CITIZEN* in English
5 Dec 90 p 18

[Article by Keith Abendroth and SAPA]

[Text] Sea and marine life pollution along the Cape coast is spreading at an alarming rate and holidaymakers have been advised to stay clear of waste water and sewage outlets that lead into the sea.

A survey by the Foundation for Research Development, together with the Department of Environment Affairs and the Department of Health, has pinpointed the problem particularly at False, Hout and Algoa Bay.

It has warned that dangerously high concentrations of virulent bacteria and viruses, indicating faecal contamination, have been found along the coast and particularly near storm and waste water discharge points into the sea, as well as at river mouths.

It warned beachgoers not to swim or eat shellfish within 50 metres of the danger points on the False Bay coastline. Bathers who come into direct contact with polluted water can get gastro-enteritis, dysentery and infections of the ear, eye, skin and respiratory system.

Large quantities of contaminated shellfish and mussels can also cause mild to severe food poisoning, said the report.

The pollution was carried by stormwater drains, rivers and sewerage outfalls.

Planning

It has called for stepped up planning and research "before any additional discharging of waste water is allowed along our coast."

However, the report on the project released yesterday states that recognised bathing beaches on the Cape coast are—according to existing knowledge—"completely safe."

The report on the research, which was conducted between April, 1987, and March this year, and concentrated on the three specific areas, stated that there was increasing concern worldwide about the use of the sea as a dumping ground for refuse.

Concern

Summing up, the report said that there was strong reason for concern over potential health hazards caused along the coast by polluted water.

"At present, the pollution danger is still largely confined to areas where waste and storm water, or water from polluted rivers, are discharged into the sea," said the report.

"But all indications are that the problem is increasing, pointing to an urgent need for further study and the need for better planning and control."

Experience was that there were no health hazards where well-planned and built sewage outlets were situated and were carefully monitored.

"People at risk are holidaymakers who are keen swimmers, divers or surf-boarders, as well as those who are fond of seafoods like mussels and oysters; and they have cause for concern over the pollution of our coast areas because of urban waste water discharges."

Plan To Import Toxic Waste Into Ciskei Revealed

91WN0172A Johannesburg THE WEEKLY MAIL
in English 6 Dec 90 p 2

[Article by Eddie Koch—first paragraph introductory comment]

[Text] A multi-billion rand deal to dump toxic waste in Ciskei, involving notorious international arms dealers, has been uncovered.

Ciskei is negotiating a deal to import 200,000 tons of heavy industrial waste from Europe each year—and senior sources in the waste industry and government believe disgraced National Party MP. Peet de Pontes helped broker the deal.

Gian Franco Ambrosini, notorious for dumping deadly cargoes of waste in Nigeria and Guinea Bissau, is the European middleman. Leigh Environmental, a British company which helps move waste from Europe to the Third World, is also involved.

Ambrosini and Leigh chairman Malcolm Wood recently visited Ciskei to set the multi-billion rand scheme in motion.

An Austrian-based company, known only as ABC, is fronting the project and Brigadier Oupa Gqozo, Ciskei's military ruler, is said to have clinched the deal when he visited Austria last month.

The wastes destined for Ciskei will come primarily from European chemical corporations if the deal goes ahead. Shiploads of the consignments will include deadly polychlorinated biphenols (PCBs), toxic heavy metals and contaminated industrial sludge.

THE WEEKLY MAIL's sources, who asked not to be named because they are government employees, say Ciskei is planning to build a massive recycling plant and has already employed a top-level team of scientists to handle the project. The plant will include rotary kilns capable of incinerating the "real dirty stuff."

They believe De Pontes, a former Nat MP convicted on six charges of fraud, helped set up the deal through his extensive contacts with officials of the Ciskei government.

De Pontes denied that he was involved in the deal when contacted by THE WEEKLY MAIL yesterday. However, he acknowledged that he had set up meetings between the former Ciskei president, Lennox Sebe, and overseas companies wanting to export toxic waste. He said his former partner, Vito Palazzolo, may be involved in the current project.

PCBs and other heavy industrial wastes are worth an average of R7,500 a ton, allowing Ciskei to earn some R1.5-billion a year in foreign exchange if the deal goes ahead.

The Ciskei government acknowledged that it is considering the possibility of importing European waste but refused to answer queries from THE WEEKLY MAIL yesterday.

"My instructions are to say nothing," said Ciskei liaison officer Ian Dickson. "Whenever I ask members of the Council of State (the military body ruling Ciskei) about the matter, I am told to 'get lost.'"

Gqozo has already met senior South African officials to discuss the deal. Pretoria is, however, opposed to toxic deals being handled by the homelands as it is busy formulating its own policy on waste.

The Ciskei government plans to bring shiploads of industrial waste through East London and the sources say Gqozo is prepared to build his own harbour on the Ciskei coast if the South African authorities refuse to co-operate.

It appears that Ambrosini decided to negotiate a toxic waste deal with the Ciskei government after Transkei ruler General Bantu Holomisa reversed advanced plans by his administration to import industrial waste into Transkei.

THE WEEKLY MAIL has documentation from Ambrosini's Italian-based company, Intercontract SA, which prove that he has advanced plans to export massive amounts of industrial waste to the homelands.

Ambrosini acquired the name "Mr. Poison" after it was discovered that his company had dumped 1,000 tons of extremely hazardous material at a port called Koko in Nigeria. Some of Ambrosini's poison-laden ships achieved notoriety when they were forced to sail the seas after being shunned by ports world-wide.

Ambrosini, together with his associates, Swiss arms dealer Arnold Kuenzler, are coordinating a concerted drive to get Southern African states, including Angola, Namibia and a number of homelands, to accept consignments of toxic waste.

A Ciskei government press release on the issue says: "The council of state denies any plans for toxic waste disposal technology. It is, however, exploring the feasibility of recycling industrial waste derived from a variety of manufacturing processes as chemically inert material to be used in linked factories.

"The services of internationally acknowledged scientists and other experts conversant with all aspects of the Basel Convention (which regulates the international movement of hazardous materials) have been retained. They

are involved in all aspects of any projected waste disposal in an ecologically sensitive manner."

THE WEEKLY MAIL is in possession of documents which detail plans by Ambrosini to export contaminated soil and metal slags from Europe and the United States to Transkei. "The quantity of this material is huge," says a letter signed by Ambrosini and dated March 16, 1990.

Another document prepared by South African Harbours officials at East London says the harbour is capable of handling 1,000 to 1,500 tons of heavy waste per shift. "It could be possible that a berth be set aside exclusively for this cargo," the document states.

Minister Announces River Life Research Project

91WN0185A Johannesburg ENGINEERING NEWS
in English 14 Dec 90 p 4

[Text] Water Affairs and Forestry Minister, Gert Kotz, has announced that a R479,000, three-year contract to research the effect of water quality variables on riverine plant and animal life has been awarded to the University of Cape Town's Zoology department by the Water Research Commission.

The results of this project are expected to lay the foundations for new techniques and methodologies applicable to any water quality investigation in South Africa which determines the water quality required to conserve natural aquatic ecosystems, says the Department of Water Affairs in a press release.

Water quality determines the numbers and types of aquatic species and communities, as well as the normal processes that lead to the natural functioning of aquatic ecosystems.

The new policy of the department is to manage the quality of receiving water rather than that of effluents.

In the past, the policy has been that effluents must comply with uniform standards before being returned to a river reach or water body.

The department says some relatively innocuous effluents have been cleansed at great expense, perhaps without this being really necessary.

On the other hand, it states that the combined loads of several legal effluents are sometimes highly detrimental to the water body.

It is necessary to determine how much of each pollutant a river reach or water body can absorb without harm.

Similarly, says the department, it is necessary to calculate the appropriate quantities of effluents of the quality that can enter a river without further treatment.

Provinces Want Right To Judge Environmental Impact

91WN0189A Toronto THE TORONTO STAR
in English 5 Dec 90 p A13

[Article by William Walker]

[Text] Ottawa—Provincial environment ministers want to limit the federal government's power to assess the impact of major development projects.

They want Ottawa to butt out of environmental assessments of developments they feel are primarily of provincial concern.

But environmentalists are fiercely opposed. They warn it will allow the provinces a free hand to conduct sloppy assessments for preferred projects.

No environmental issue has caused more confrontation in the past year than environmental assessment. Ottawa has clashed with:

- Saskatchewan over the Rafferty Dam.
- Alberta over the Oldman Dam.
- Quebec over the proposed James Bay II hydroelectric development.

In response, the Progressive Conservatives brought forth Bill C-78, which proposes to put federal environmental assessment rules into law. The bill is now under parliamentary committee study.

But in a major development yesterday, British Columbia Environment Minister John Reynolds submitted a list of nine amendments to the bill that he said are being demanded by all provinces and territories except Quebec.

Due to its constitutional stance, Quebec boycotted the ministers' council meeting last week in Victoria where the provinces' game plan was formalized.

Key among the provinces' amendments is a clause that would allow Ottawa to hand over responsibility for assessing a project to the province alone.

The amendment would "provide an opportunity for the federal minister to transfer responsibility to a province for all or part of an environmental impact assessment," Reynolds told MPs.

The provinces propose to:

- Cooperate on joint assessments in which both federal and provincial jurisdictions are affected.
- Allow Ottawa the lead role when the primary impacts are transborder or international.
- Let provincial cabinets have the final say on whether projects may proceed when provinces feel most impacts are within their own jurisdiction.

Reynolds said recent federal-provincial conflict over environmental assessments has resulted in a flurry of court actions and "uncertainty and confusion."

"Projects are getting killed ... we're studying them to death," said Reynolds, chairman of the Canadian Council of Ministers of the Environment.

He said the provinces favor deciding the jurisdictional split through negotiated protocols on a project-by-project basis or on classes of projects.

Western Pulp Mill Dioxin Discharges Contaminate Shellfish

91WN0188A Vancouver THE SUN in English
30 Nov 90 p B7

[Article by Glenn Bohn]

[Text] The federal government says it found mostly low dioxin levels in B.C. [British Columbia] that "would not pose a health hazard" for people.

But "consistently high" dioxin levels in some locations forced the government to extend fishing closures around six coastal pulp mills, said fisheries department spokesman Mike Nassichuk.

The government hasn't yet estimated the total area now closed around the pulp mills or the percentage increase from previous closures, he said.

Nassichuk said the greatest economic impact of the new closures may be on B.C.'s commercial crab fishermen. He said they harvest about \$6 million worth of crab annually.

The waters now closed for these fishermen "are, for the most part, areas that are fished on a part-time basis by very few vessels," Nassichuk said.

The federal survey found "consistently high" levels of dioxins and [words illegible] the digestive glands of crabs and some muscle tissues of crabs, making previously announced harvesting bans still necessary.

Fisheries and Oceans Canada is also recommending that consumers ensure that bottomfish taken near coastal pulp mills are properly gutted and that the liver not be eaten.

Rockfish, cod and flatfish are bottomfish species.

The government says the fillets of all coastal bottomfish and finfish species "poses no concern to human health."

Following is a list of other health advisories and fishing closures:

- Health and Welfare Canada has advised people not to eat the digestive gland (the hepatopancreas) of Dungeness crab collected near Campbell River, Powell River, Nanaimo, Crofton and Kitimat.

—Dioxin and furan residues in other fish and shellfish near coastal pulp mills were described as "generally low."

"Exceptions were prawns, ratfish liver and rockfish liver from Gold River; cabezon, red Irish lord and Pacific cod livers from Campbell River; English sole and oysters from the Powell River area; and oysters from the Crofton area."

The public is warned not to eat these species near those sites.

—A ban on commercial crab harvests was extended in waters adjacent to pulp mills near Gold River, Powell River, Elk Falls, Harmac, Crofton and in Kitimat

Arm. A closure for recreational and native Indian crab fishermen near Gold River has been extended and the prawn-fishing closure for all harvesting there remains in effect.

—A closed area for oysters has been extended near Powell River.

—An advisory was issued not to eat the liver of sturgeon caught in the Fraser River between Quesnel and Prince George.

—People should not consume the muscle of the common merganser (a seabird eaten by some people) from Howe Sound.

State Council's Strategy for Environmental Protection

91WN0155A Beijing ZHONGGUO HUANJING BAO
[CHINA ENVIRONMENTAL NEWS] in Chinese
8 Nov 90 p 3

[Article by Ma Hong [7456 3163], Director of the State Council Development Research Center

[Text] Along with the progress being made during the last 12 years in economic system reforms, China has also made gains in economic construction and environmental protection. Although the volume of discharged pollutants has increased during this period of time, China has been able to avoid the effects predicted by some domestic and foreign experts that "If production doubles, pollution doubles also". A brief introduction to the coordinating of environmental protection policy with China's economic system policy follows:

1. Changing Strategy

Since entering the eighties, as headway was being made in economic system reforms, great changes were also being made in China's economic development strategy. One of its main features is the general policy that emphasizes keeping a proper balance between adjusting and sustaining the people's economy and its various social aspects, and pursuing a parallel harmonious development of environmental protection and ecological safeguards; another is to pay attention to quality as well as quantity in pursuing development targets, and in the improvement of the people's livelihood to include improvements in environmental conditions and the quality of the environment; a third is, in cases where speed of development and economic performance conflict, stress economic performance, and work to change the past habit of caring only about production volume and rapid increase in value of output; and fourth is in expanded reproduction, to focus on deep and technological changes in existing enterprises means to apply new techniques and new technologies to broaden production capability and raise economic performance; it simply is not a one dimensional expansion of basic construction. These measures are also of the utmost value in combating pollution and improving the quality of the environment.

2. Establishing National Policy

When the 2nd National Environmental Protection Conference was convened in 1983, the State Council formally decided to make environmental protection a fundamental state policy. Through the long experience of putting environmental protection into practice, China gradually formed a fairly well perfected system of environmental protection policies that emphasizes prevention, and includes linking prevention with controls, consolidates administration and policy, applies the "He who pollutes will be dealt with" policy, and a policy for

strengthening administrative controls. The facts prove that pursuing these environmental protection policies has been very effective.

3. Formulating General Policy

As economic reforms were pushing ahead, China drew up a policy for a long-term sustained, steady, and coordinated development strategy. In line with this, in the seventies, a "32 Character Policy" and the "Three-step Policy" for developmental construction projects were formulated. Entering the eighties, China again created a policy to unite economic construction, urban and rural construction, and environmental construction in a "Three Lock Step" and "Three Payoffs" policy: Plan in step, carry out in step, develop in step for economic payoffs, social payoffs, and environmental payoffs.

4. Incorporating Into Plans

In reforming China's planning system it was important to aim at excesses of centralization in the original planning system, over-management, neglect of the law of values and market utilization, disengagement of input and output, and neglect of environmental protection, and the spread of such abuses. In order to incorporate environmental protection into national planning, the departments in charge of environmental protection in organizing and formulating annual environmental protection plans for departmental and local levels, and setting foundations for intermediate and long range environmental protection programs, have since the Sixth Five-Year Plan (1981-1985), begun including environmental protection in the national people's economic and social development plans, and presenting measures that include policies, laws and regulations, inspection and control, and capital investment. In the following Seventh Five-Year Plan, China continued to bring environmental protection into national economic and social development plans, and moreover, gave prominent attention to the feasibility and outcome of such measures.

5. Perfecting the System

In assessing many years of practical experience, it became clear that environmental control and environmental construction were two different ideas. Environmental control directs general and specific policies and regulations for supervision against undesirable environmental effects caused by construction or social activity. This is the basic responsibility of environmental control departments. Environmental construction applies measures for the benefit of economic and social environmental protection in accordance with the requirements of national environmental policies, laws, regulations, and plans. This should be done by the various people's economic departments. Most recently, China has implemented an environmental protection responsibility system which stipulates the environmental responsibilities of the various levels of government leadership that all will heed.

6. Strengthening Organizations

China's environmental control organizations have evolved from nothing, to small, to large, and from unsound to rather strong. Now, China has a State Council Environmental Protection Commission that is responsible for environmental protection strategy and major policy formulation for the whole country. Directly subordinate to the State Council is the National Environmental Protection Bureau which is the administrative organ of the State Council Environmental Protection Commission, and it has overall control of all organizational leadership, planning, coordination, and supervisory control throughout the country. The provinces, cities, counties, towns, and even medium and large enterprises have all set up commensurate environmental protection organizations. A system of environmental control organizations has been formed throughout the country. At central, provincial, and city levels there are environmental research, monitoring, and education centers, and nearly 50,000 professionals are engaged in environmental protection.

7. Changing Functions

One important aim of national economic system reform was to simplify administration and delegate authority, and to separate government from industry. It was important for government to cut back and change functions of organizations. But, environmental protection organizations were weak links to begin with, so in the organization reform they were strengthened, not weakened. Now, the State Environmental Protection Bureau work force has increased from over 100 persons to over 300 persons. At the same time the State Environmental Protection Bureau, in line with the intent of organization reform, changed its function in principle, specifying its own responsibilities, mission, and requirements; that it should be the controlling department for all State Council environmental protection issues, administrative organization of the State Council Environmental Commission with responsibility for overall control and leadership, and asserted the principle that all specific tasks should be passed down to the units and localities directly involved, and carried out the "Three Fix" actions: fix responsibilities, fix strengths, and fix organizations.

8. Optimizing Structures

The major question that China faces in its reform and development is how to lay a foundation for long-term sustained, steady, and coordinated development in order to achieve increased economic, social, and environmental payoffs, have a rational development of natural resources, safeguard ecological balance, reduce environmental pollution, further adjust production output and product mix, and make technological advances. China has many environmental problems, but whether it is environmental pollution or ecological damage, it's all traceable to irrational development and utilization of natural resources. Therefore, the raising of China's industrial and economic performance, and improving

ecological and environmental conditions, all depend on preserving and making sensible use of natural resources.

9. Favorable Pricing

The price distortion phenomenon of "High product costs, low raw material prices, worthless natural resources" is as serious in China today as ever. China plans to employ a "control, adjust, release" unified price structure policy. Seeing that conditions are not yet ripe, China must still use a fixed measure of control on energy and raw material price structures, but at the same time it must be seen that the depressed raw material price structure is primarily due to worthless natural resources, and that has a deleterious effect on the raw material price structure process. In order to turn around the price structure distortion, worthwhile concepts of value, value theory, and rational pricing methods must be established for natural resources. Of course, it must be a measure that links together natural resources, and ecological and environmental protection.

10. Improved Accounting

The existing national people's economic accounting system has a major deficiency in that it uses the value of production and the speed of its increase as an important indicator, but that's not the only reason it is a deficient system. That it disregards quality and profits is another, and it is also one of the causes of loss of natural resources, ecological damage, and environmental degradation. In the past few years as economic system reforms deepened, the State Council set up the National People's Economic Accounting System Reforms Coordinating Commission which has worked up a preliminary reform plan. Looking at it now, the plan still does not contain an accounting of natural resources. So research is now being organized to derive theory, principle, methods, and an implementation scheme for natural resources accounting and its inclusion in the national people's economic accounting system, and research into the question of delineating natural resource property, and a property rights control system, and research into promulgating a development policy for increasing and expanding reproduction of natural resources and product output items, so as to find through this research an effective course for a sustained, steady, and coordinated development of the economy, the society, and the environment.

Energy Ministry's Strategy for Environmental Protection

91WN0155B Beijing ZHONGGUO HUANJING BAO
[CHINA ENVIRONMENTAL NEWS] in Chinese
8 Nov 90 p 3

[Article by Minister Huang Yicheng [7806 3015 6134], Ministry of Energy Resources

[Text] The Chinese government is giving serious attention to the proper handling of the relationship between developing energy resources and protecting the environment. Coal is of special interest in the energy structure as

it makes up 74 percent of China's primary energy sources, but only 23 percent of it is converted into clean and convenient electrical energy, and coal smoke pollutes the atmosphere and the environment. Of course, large amounts of coal gangue and coal ash also result from the mining and use of coal, and must be properly disposed of as well. Since China's early development, the environmental problems that have resulted from the exploitation of energy resources have largely come from the burning of coal. Therefore, the Chinese government has adopted the following measures to deal with the policy, the economic, and the technical aspects of the problem.

1. Promote Policies for Conserving Energy Resources and Other Measures Beneficial to Environmental Protection

1. Strictly Enforce Energy Resources Conservation

The supply of energy resources is stringent, consumption everywhere is high, and there is much waste. In the past 10 years, because a series of policy measures have been adopted, China has made real progress in conserving energy, saving an average of more than 20 million tons of standard coal per year. Because coal is the mainstay of China's energy structure, emphasis has been placed on saving coal through specific measures: 1, save coal at power plants, 2, put tight controls on the blind development of small industrial furnaces, 3, limit the development of condenser type small thermal power plants, 4, use low-temperature fuels.

2. Speed Up Hydroelectric Construction

Hydroelectricity is a reusable, clean energy resource, and rapid hydroelectric construction is an important measure in improving China's energy structure. China's water power resources, the richest in the world, are capable of providing 380 million kW of electricity. China is very serious about developing hydroelectricity, and capital investment in hydroelectric construction increases every year. By 1989 the total installed hydroelectric power capacity throughout the country exceeded 34.5 million kW, and the amount of generated power was 118 billion kWh, 20 percent of all the power generated in the country.

3. Constantly Raise the Ratio of Coal Being Converted to Electric Power

About 23 percent of all coal produced is now being converted to electric power, much less than that among developed countries. In order to hasten electric power construction, more coal must be converted to clean electric energy. In the last two or three years, China's average annual newly installed thermoelectric units has been about 8 million kW, using about 50-60 percent of coal output increased each year. It is estimated that by the year 2000 the ratio of coal used to generate electricity will rise to about 35 percent.

4. Develop Coal Washing Processes

Washing coal can reduce ash and sulphur, raise coal quality, and can beneficially reduce inefficient transportation as well as benefit environmental protection. In 1989, the volume of coal washed at mine sites reached 123 million metric tons. Eventually all long haul transported coal will be washed.

5. Rational Distribution of Coal

One means of reducing urban atmosphere and environmental pollution will be to increase the ratio of gasified coal in use, and another will be to supply, as much as possible, high grade coal, low sulphur and low volatility coal, and provide it preferentially for home use.

6. Popularize the Use of Briquettes

Coal is the primary energy resource used by town and city residents throughout China, comprising over 80 percent of the energy consumed. Each year over 200 million tons are used by city and town residents, most of whom use a scattered raw coal burning method, which not only has low heat yield, but is the main source of atmospheric and environmental pollution in the cities. If briquettes are used combustion is more complete, heating efficiency is higher, carbon monoxide is reduced by 70-80 percent, coal dust by 66 percent, aromatic hydrocarbons by 50 percent, and can save coal by 20-30 percent. If sulphur hardeners are added, sulphur dioxide discharges can be reduced by 50 percent. Popularizing and developing briquettes accords with national conditions, and is a realistic approach to solving the raw coal pollution problem most economically. This measure must be adopted to speed up spread of briquette use, and by this century's end all homes can be using briquettes.

2. Actively Control Pollution, Protect the Environment

In order to guarantee a coordinated development of energy resource production and environmental protection China must encourage all energy enterprises to face the challenge in every way, to accumulate capital, unite technical reform and pollution control, and emphasize the following aspects of the pollution control effort.

1. Control coal dust. More than 80 percent of the large units in coal power plants across the country are using high efficiency electrical dust precipitators, and they are being used in old power plants more and more. All power plants subordinate to power networks have an average dust-control efficiency rate of 93 percent, which meets the national Seventh Five-Year Plan target, it is expected to reach 95-96 percent by the end of the Eight Five-Year Plan, and so now the carbon dioxide pollution issue has been placed on the agenda.

2. Consolidate control of water effluent from coal mines and power plants. Each year mine water and ash water effluent amount to more than 2 billion tons, wasting water resources and polluting the environment. China has united technological reforms, making the old enterprises build waste water recycling systems, raise their reuse rates, and reduce effluents. Inclusion of water

saving and reuse measures in the technologies and facilities of new construction projects is also being required.

3. Consolidate use of coal gangue and powdered coal ash. China has laid down a preferential policy with respect to encouraging various departments and units to use powdered coal ash to build roads, make bricks, and to use fine granulated coal ash as a mixing material for cement and aggregate materials, and to use coal gangue in a similar way. At Huaibei in Anhui, Xinwen in Shandong, and Pingdingshan mining district in Henan successful testing and use of coal gangue and powdered coal ash to fill cave-ins at mines and wells have been accomplished.

4. Collect and use methane gas from coal mines. In 1989 the volume of methane gas taken from coal mines reached 358 million cubic meters, 20 percent of the total emitted gas, and the volume used was 258 million cubic meters. For now, methane gas is limited to home use. Relevant departments are now in the process of studying a formulation of policy on the use of methane gas from coal mines as the rate of collection and utilization increases with each year.

Strategy for Environmental Science and Technology in 1990s

91WN0155C Beijing ZHONGGUO HUANJING BAO
[CHINA ENVIRONMENTAL NEWS] in Chinese
8 Nov 90 p 3

[Article by Department Chief Deng Nan [6772 2809],
State Science and Technology Commission, Social
Development Department]

[Text]

1. Priority Development Areas and Primary Mission

The priority development areas and primary mission for China's environmental science and technology in the 1990s is the integration of environmental targets and the service to bring them about. Based on the present environmental conditions and environmental strategy, those priority areas and primary mission are as follows:

1. Scientific Research and Technical Development for Improving and Restoring Ecological Systems of Ecologically Fragile Areas.

Ecologically fragile areas are those areas where natural ecological damage is quite severe, and appears to be prone to continuing degradation. Ecological degradation is a gradual process, and if measures are not taken at the earliest possible time, the ecological system in those areas could become very difficult to restore to good environments, and could thereby lead to large scale ecological disasters directly affecting economic development, and the lives of the inhabitants of the region. Among such important areas are Nei Monggol, Liaoning, Hebei, Shanxi, Shaanxi, Ningxia, and the loess plateau of the adjoining mixed agricultural and pastoral areas.

Another ecologically fragile area is the red earth hill region of the southeast, and still another is the eroding areas of the middle and upper reaches of the Yangtze River.

Research on types of ecosystems, and development of technology for restoration and rebuilding those areas consist of studying the various types of ecological structures suited for the geography and climate of those areas, determining an overall strategy, proposing rational deployment of programs and control measures for the ecological structure, establishing model ecological areas with good environments in large representative areas, and disseminating technical methods and policies.

Among the aforementioned scientific research and technical development activities there must be particular emphasis on coordination of ecological construction and economic construction. Improvement of ecological conditions must have a positive impact on economic development in the area, and bring benefits to the broad masses. Only in this way will the masses respond positively. This will make protection and improvement of ecosystems become their own action, and then the restoration and rebuilding of ecosystems will endure through time.

2. Research and Development of Pollution Control Technology and Facilities

During the past 20 years, pollution control technology and facilities R&D have come a long way. The remaining gaps are mainly basic weaknesses in some areas such as lack of workable technology for handling waste water in some industries, standardization of certain pollution control installations and facilities, low levels of standardization and industrialization. Pollution control research and technological development for the 1990s mainly falls into the following areas:

Poisonous and injurious industrial waste control technology remains comparatively weak. In the next 10 years research must be done on pollution effects, and control technology for poisonous and injurious wastes, and programs must be drawn up to deal with them. The methodologies developed must be compatible with Chinese conditions. Research and development of processing installations and facilities for handling various kinds and extent of poisonous and injurious substances; fully separating, reliable, and feasible city trash processing technology; and research and development of processors and facilities of other types and standards must also be done.

Water and atmospheric pollution is still a wide ranging and serious environmental problem. In the area of water pollution control technology, research should be strengthened in those industries that still lack reliable and workable control methods, especially in the paper, chemical, printing, and pharmaceutical industries. Research on technology and facilities for handling polluted city water as a resource, with emphasis on programs for sustained river water quality, and feasibility

studies on river and ocean discharging technology, and even on land-source pollution effects on nearby seas and ocean areas.

In the area of industrial production R&D, the eradication of sulphur from smoke and gases, technology and facilities for solidifying or removing sulphur from combustion processes, research and development of industrial waste gases and automobile emission control technology, and continued study of the effects of long distance transportation on the atmosphere, all of these are the important mission of research and development of atmospheric pollution control.

Strengthen research and development of large scale precision monitoring instruments, and study the effects of atmospheric pollution on public health.

3. Strengthen scientific assessment of global environmental changes, their effects, and counter measures for them.

Whatever the activity, even if it is for the development of the Chinese economy, the possible ill effects that it might have on global weather must be taken into consideration. Research on global weather changes will be an important part of China's environmental science for the next 10 years. It includes further perfecting global weather change models for consolidated study and research, of which ocean-atmosphere relations and cloud layer influences on global warming will be the main model elements. Regional weather change trends and its extent and influences will be emphasized, and research on national actions for prevention and countermeasures will be done.

Although compared to advanced countries China's carbon dioxide emissions relative to population are low, in order to protect global atmosphere, China still must control carbon dioxide emissions. In-depth studies of the energy resource structure system must be done with emphasis on conservation of energy resources, and attention given to policy suggestions and technical measures on energy resource utilization rates and changes in the energy resource structure. As the population grows and the economy develops increases in carbon dioxide emissions cannot be completely avoided, but their rate of increase must be reduced as much as possible.

Strengthen research on fluorine, chlorine, hydrocarbon substances, halon [0761 7893], and substitutes for substances that deplete the ozone layer. As facilities are imported, study of their assimilation and absorption, and education of technical personnel must be done.

Further protection of rare and endangered species, replenishment of their populations, and protection of the diversity of biology must be accomplished.

2. Development Strategy and Policy

In environmental protection work, the relationship between economic development and environmental protection must be properly managed and coordinated. In the S&T realm, economic construction S&T and environmental protection S&T must be organically united, mutually advanced, and complementary. In economic construction, efforts must be made to focus, as far as possible, on use of technology that is not harmful to the environment. The development of environmental protection S&T broadly depends on S&T conditions in other economic areas, and it must interact with the forms of S&T in the economic realm.

Strengthening investment in environmental S&T is the important foundation of environmental S&T development. Particularly, it should be seen that development of environmental S&T is for the public good, and embodies broad social benefits. Nations should develop their economies and environmental sciences simultaneously. While scientific activity is going on, changes in scientific system should be going on as well, new levels of machine processing should be introduced, and macro-controls should be strengthened to enhance development of environmental S&T.

If there is to be growth in the utilization of applied technology, then, as far as possible, it should be tied to applied research and engineering, and in order to serve economic construction and environmental construction, the results of research should quickly convert to production strength. Attention should be given to the construction of laboratories, limited capital and manpower should be accumulated, several high level national laboratories should be built. International advanced environmental S&T goals should be followed as far as is practical, and wide ranging and solid scientific research and testing methods must be used to support development of environmental protection technology.

Protecting the ecology and the environment benefits all mankind. International cooperation in the ecological and environmental realm provides vast prospects, and international cooperation and exchange should be increased. China's many technicians are being encouraged to enter the international stage of environmental protection.

Rules To Monitor Environmental Pollution Reviewed

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[CHINA ENVIRONMENTAL NEWS] in Chinese
8 Nov 90 p 3

[Article by State Environmental Bureau, Deputy Bureau Chief Jin Jianming [6855 7003 2494]]

[Text]

1. Environmental Protection Controls on Construction Projects

Early in 1973 the "Three Concurrents" system was proclaimed, "Pollution prevention installations in new

construction projects in the industrial and mining enterprises are to be designed concurrently, built concurrently, and started up concurrently with the main body of the project; the environmental effects reporting system, ("PRC Environmental Protection Law"), ("Water Pollution Prevention Law"), and the ("Atmospheric Pollution Law") were all differentiated and clearly stipulated.

In their implementation these systems gained wide attention, the 30 provinces of the mainland, autonomous regions, directly subordinate cities (with the exception of Tibet), and nearly 20 industrial ministries, all in accordance with their individual actual situations formulated the ("Implementation of detailed rules and regulations on construction project environmental protection control procedures").

These systems also stipulated "Reconstruction, expansion, and technological advancement projects must, in accordance with the principle of "taking the old with the new", deal with relevant original pollution, under reasonable economic conditions, and do it concurrently, including opening up capital channels for tackling old pollution, and that way meet the targets for improving environmental quality.

2. Polluters Pay System

Applying the international example of the "Polluters Pay" method, at the close of the seventies, China put into effect the "He who pollutes will be dealt with" policy, and with that came the polluters pay system. In carrying out this system the accumulative imposed pollution fines from 20,000 businesses and enterprises were 8.37 billion yuan, and from that the accumulative total used for grants-in-aid was 6.02 billion yuan, making up 15 percent of the total invested in pollution actions during the period. During that time supplemental grants-in-aid for buying and installing environmental monitoring instruments and facilities totalled 1.33 billion yuan.

3. Environmental Monitoring

At the outset, China's environmental monitoring was manufactured as required for environmental controls, as environmental controls were intensified it also developed in stride, and as environmental controls were even further strengthened it too was further developed to even higher levels. China has already formed a monitoring system with the Environmental Protection Bureau as the head, and industrial departments and other concerned departments spreading out the monitoring. There are now more than 4,000 monitoring stations in China, and more than 70,000 professionals engaged in monitoring. China's monitoring station are distributed in networks according the national situation. The national environmental quality monitoring network with the main monitoring station as its center which was the first to be constructed includes the following networks: atmosphere

monitoring, ground water, acid rain, radiation, noise, and an ecology monitoring network. At present China is studying the issues of density control standards and total volume control methods, and the means of uniting them into one effort. In applying the polluters pay principle China has proposed a reform to either establish an environmental protection fund or set up an environmental protection investment corporation type of economic organization to use polluters pay receipts as credit capital.

On the environmental monitoring front, China has not yet begun monitoring the "greenhouse effect" which concerns the world so much, nor other hot items like monitoring the ozone layer.

Control Measures for Environmental Pollution Studied

90WN0291A Beijing DILI XUEBAO [ACTA GEOGRAPHICA SINICA] in Chinese Vol 45, No 2, Jun 90 pp 178-186

[Article by Zhang Shen [4545 3947] and Tang Yijian [0781 0110 0494], Institute of Geography, CAS, Beijing]

[Text] Abstract: The pollution of China's water, air, and land and the pattern of change is analyzed. The analysis results show that because of the differences in natural conditions and economic development in different regions, environmental pollution also showed a strong dependence on regions. For this reason, environmental policy must also consider the changes in China's natural and economic changes in order to take advantage of the self-cleansing ability of the environment and to make an overall plan in laying out industry and agriculture sensibly. In addition, scientific and technological means should be employed to improve the production process, control the release of pollutants, and follow different avenues to improve environment management and legislation.

China has a large population, a complex natural environment, and an uneven development of the economy in different regions. Therefore, China's environmental problems also show distinct region-specific characters. In densely populated eastern China where the economic development progresses rapidly, environmental pollution is more severe. In sparsely populated western China where natural conditions are poor, the more prominent problem is ecological damage and deterioration. Although environmental pollution and ecological damage are two different problems, they are closely related. In different stages of economic development, ecological and environmental problems take on different form, and require different policy. In this paper we

discuss the main characteristics and trends of China's environmental pollution and the policies and measures that should be adopted.

I. The Status of China's Environmental Pollution and Protection

Environmental protection is one of the basic policies of China. Under the policy of simultaneous development of the economy, the cities and villages, and the environment, a series of environmental protection measures have been taken. These include controlling new pollution sources, treating old pollution sources, and comprehensive treatment of the environment. Major achievements include the following:

(1) From 1981 to 1985, China engaged in 120,000 pollution treatment efforts and increased its waste water treatment capacity by 2 billion tons per year.¹ In 1981 and 1985, the percentages of meeting the standard for

industrial waste water treatment in China were 26 percent and 41 percent, respectively, the treated volumes were 3.1 billion tons and 5.7 billion tons, respectively, and the percentages treated were 13 percent and 23 percent, respectively.

The amount of hazardous heavy metals and arsenide, phenol, and cyanide in waste water has steadily dropped over the years. Compared with 1980 figures, the pollutants have dropped by 30 to 70 percent (see Table 1).² Pollution survey, water quality evaluation and comprehensive water pollution management have been made for the Guanting Reservoir, the West Lake in Hangzhou, the Ji Canal, Songhua Jiang, Xiang Jiang, Bo Hai, and Huang Hai. Based on incomplete data, about 100 cities and 99 rivers were treated in the period of 1981-1985 and water quality has improved. Among the major river systems in China, with the exception of Chang Jiang, Hai He, and Liao He, the water quality has been basically good; the water quality in major lakes and reservoirs showed no sign of deterioration.

Table 1. Amount of Discharge of Harmful Matter in Waste Water (ton/year)

Pollutant	1981	1982	1983	1984	1985
Hg	62.2	55.9	42.0	38.2	32.8
Cd	235.6	206.9	160.1	139.0	183.7
Cr	2,366.7	2,094.1	1,965.5	1,706.3	1,547.0
Pb	3,006.0	2,019.7	2,118.6	1,872.9	1,825.2
As	1,199.7	1,240.2	1,326.5	1,409.7	1,119.1
R-OH	21,296.5	13,373.6	12,491.1	10,947.6	11,241.6
CN ⁻	8,691.5	7,291.9	6,570.8	7,017.2	5,689.1
Petroleum	131,408	96,216	63,812	59,143	62,433

(2) Today, China's ability to treat industrial waste gas is $2.7 \times 10^4 \text{ m}^3$ per hour. The recovery of industrial dust also increased—from 703×10^4 tons in 1981 to 1431×10^4 tons in 1985 (see Table 2).

Table 2. Amount of Industrial Dust Recovered

Year	Industrial dust recovery (10^4 t)	Industrial dust recovery (%)
1981	636	45
1982	893	41
1983	1,082	50
1984	1,236	52
1985	1,440	53

Monitoring results obtained in recent years showed that dust fallout in major Chinese cities has generally dropped. Comparing the amounts in 1981 and 1985, the fallout decreased 27 percent in Beijing, 22.7 percent in Shanghai, and 54.7 percent in Tangshan. Based on the monitor results in 50 cities, the amount of particles in the atmosphere showed a drop in 19 cities, a leveling off in 22 cities and an increase in only nine cities.

From 1981 to 1985, China's comprehensive utilization rate for industrial slag increased by five percent. The use

of powdered coal in 1985 was almost twice² that in 1979. Waste treatment in China's cities began to show results.

(3) Irrational resource development has caused ecological damage to the natural environment and mismanagement of country and city enterprises has led to pollution. Faced with these problems, China has established more than 80 ecological agricultural experiment stations and has started a major forestation movement on a national level. Good progress has also been obtained in the greening of the cities and the plains, and in the building of the "San Bei" protective forests. By the end of 1985, 360 nature protection zones covering a total area of $2 \times 10^5 \text{ km}^2$ had been established. Protective measures were also taken for 350 rare plants and 270 animal species.

II. Major Region-Specific Pollution Characteristics

With national economic and urban development, population in the cities increased rapidly and industrial production and energy consumption also rose considerably. Different pollutants released in the production process continued to pollute the water and poison the environment. The major pollution sources are urban

industries. In terms of the area and severity of the pollution in China, there are large differences not only between the cities and the countries, but also between the regions. In addition to economic development, the constraining effects of the natural environment are also very important. China spans five biological climate zones from north to south, and four hydrological zones from west to east. The complex geology, contrast in hot and cold, dry and wet, and multitude of living things cause great differences in the environment's ability to withstand pollutants and have different effects on the ecological and economic aspects of society. Therefore, in order to effectively control and improve the quality of the environment, it is imperative to make a comprehensive analysis of the regional characteristics of the environment.

1. Temporal and Spatial Changes of Air Pollution

Extensive surveys and investigations have shown that the air pollution in China is caused mainly by the burning of coal. China's coal resources are distributed primarily in the north; coal reserves in northern China represent 64 percent of the national total.³ As the economy develops and the standard of living improves, the total energy consumption (converted to standard coal) showed an increase of 34 percent from 1980 to 1985. The percent of energy derived from burning coal also increased from 72 percent in 1980 to 76 percent in 1985 (see Figure 1).

The smoke and SO₂ pollution due to coal burning is quite severe, especially in north China. Data from 1985 show that the smoke and dust released in China amount to about 23×10^6 tons per year and 73 percent of that may be attributed to coal burning. Each year about 1.46×10^7 tons of SO₂ are released in China, 90 percent of which is due to burning coal.² Analysis of 1986 data showed that a full 59.4 percent of all the smoke and dust released in China can be traced to 10 provinces, cities, and autonomous regions in north and northeastern

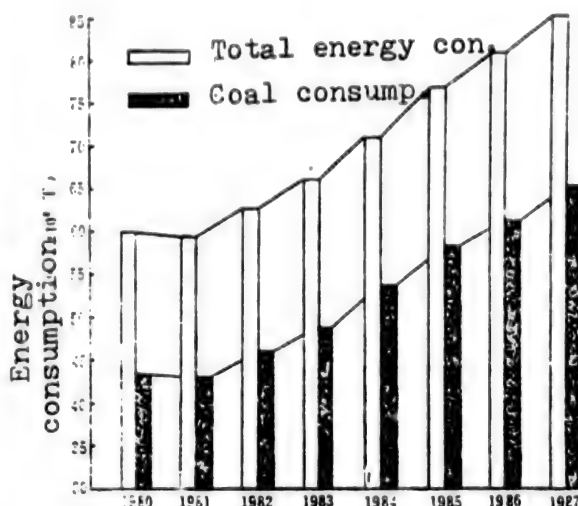


Figure 1. Variable Trends in Total Energy Consumption (Coal Equivalent) and Rate of Coal in China

China and in Shandong and Shaanxi; the percentage for SO₂ is about the same.² In the heating season in north China, populated areas are often shrouded in smoke with low visibility. A look at the SO₂ changes in Beijing from 1980 to 1987 reveals that pollution in the city is much more severe than in the country. (Footnote) (Gao Shuran [7559 2579 3544], "Air Pollution and Weather Changes, Economic Development and the Environment," Proceedings of the Symposium on Environment and Development in China, 1988.) Figure 2 shows this trend.

In China the two main sources of air pollution are SO₂ and airborne particulates. About half of the particulates in the atmosphere are attributable to coal burning and other artificial sources, and the other half is attributable to natural dust. The natural dust depends on the composition of the local soil, which, in turn, is local in character and is determined by the weather and the

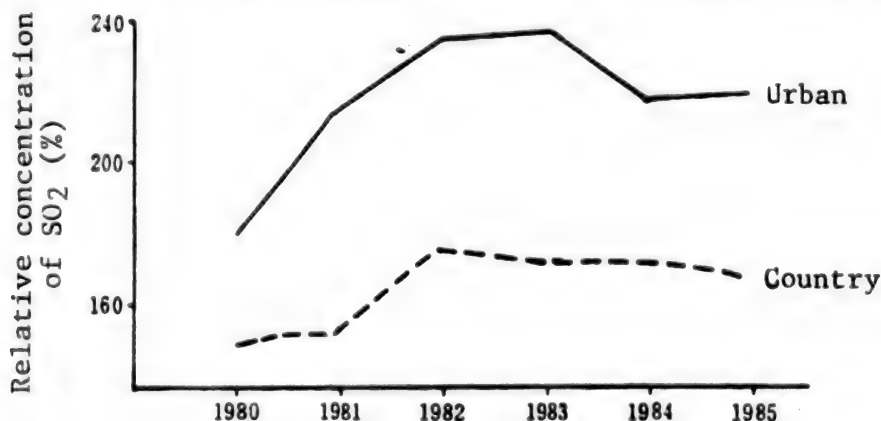


Figure 2. Variation of SO₂ Concentration (as With Health Standard of SO₂ in Air) in Beijing Area

natural geological conditions. The pH value, anion exchange, and salt saturation generally increase from south to north. As a result, the ability to buffer and suppress acidic precipitates in the air also gradually increases from the south to the north.⁴ Atmospheric pollutants such as SO_2 exhibit a pronounced environment-ecology relationship in China. Based on 1983 monitoring data, the day-average concentration of atmospheric particulates was $870 \mu\text{g}/\text{m}^3$ in northern China cities and $330 \mu\text{g}/\text{m}^3$ in southern China cities. The day-average concentrations of SO_2 in cities in southern China and northern China are respectively 82 and $106 \mu\text{g}/\text{m}^3$. However, acid rain is more serious in southern China and absent in northern China. One of the main reasons for this is the soil characteristics in northern China and the high salt exchange of the atmospheric particulates. The carbonate ions in the leuss region is high, the pH value of the environment tends to be more basic and less sensitive to the acidic precipitation. In southern China, the opposite is true. Of course, natural factors such as atmospheric environment and humidity are also important. Therefore, in analyzing the acid rain formation and effects in a region in terms of pollutant sources, natural factors must also be taken into consideration.

2. Regional Differences in Water Pollution

Water pollution is a function of the water volume and the pollution level; it is closely related to the flow rate of

ivers and economic development. As the population increases, the industrial and agricultural production and the standard of living (i.e., total national consumption) continues to go up, water usage and waste water release also continue to increase, as shown in Figure 3. In 1987, the total waste water released in China was about 348.6×10^8 tons, 80 percent of it from the cities.⁵ Most of these waste waters were released directly into the rivers, lakes, and oceans without any kind of treatment. This has led to changes in water quality to various degrees. Although the per capita waste water in China has so far been relatively low—about one-third of the world average—but the pollutant per unit area and the sewage-to-runoff ratio are both high,⁶ as shown in Table 3. Water pollution is especially serious in northern and eastern China where the level of development is high and the population is concentrated, and near watersheds close to major cities. Although the water quality in major rivers in China, such as the Chang Jiang and Huang He, is basically sound, but more than 90 percent of the river sections passing by major cities have been polluted to some degree. Major pollutants include COD, $\text{NH}_4\text{-N}$, R-OH, and CN^- . Data collected in recent years showed that the content of $\text{NH}_4\text{-N}$, $\text{NO}_3\text{-N}$, and CN^- in surface water has increased some whereas the content of heavy metals has gradually decreased. As business in the counties and villages develops, the pollution of surface water in China will tend to continue.

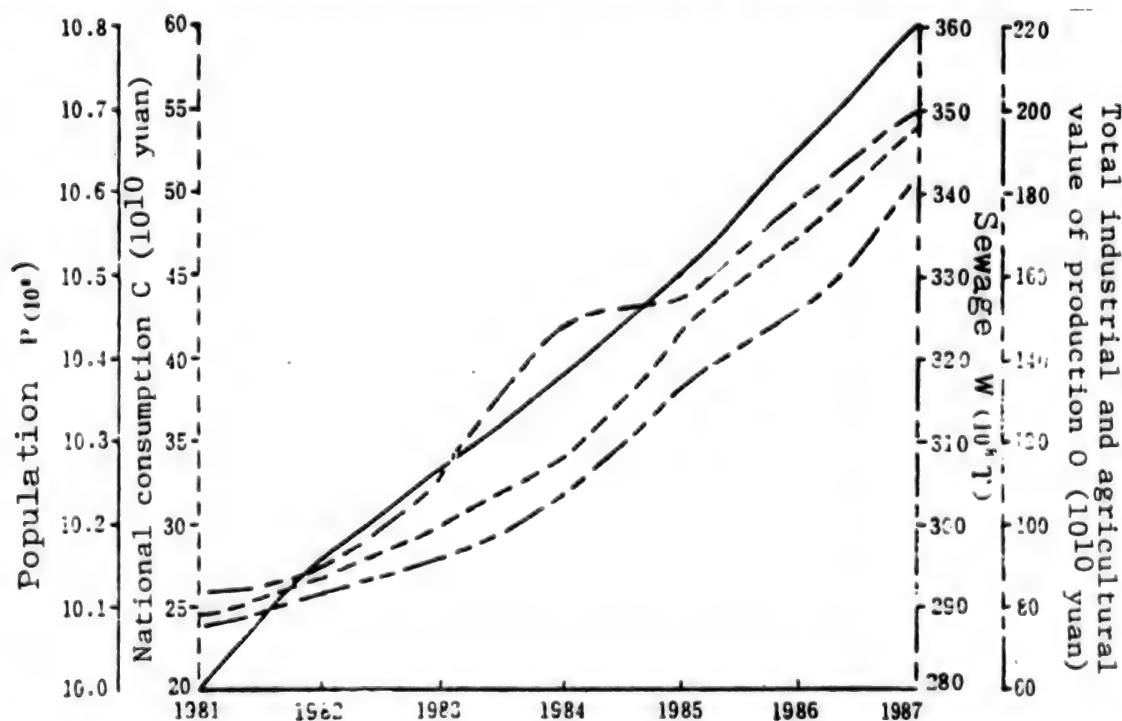


Figure 3. Relationship Between Amount of Sewage Water (W), Population (P), Total Value of Industrial-Agricultural Output (O) and Consumption of National Income (C)

Table 3. Load of Sewage-Waste Water in Different Watersheds in China

Watershed	Annual average precipitation (mm)	Annual average runoff (mm)	Per capita runoff (m ³ /person year)	Per capita sewage (m ³ /person year)	Discharge intensity of sewage (10 ⁴ x m ³ /km ²)	Ratio of sewage to runoff
Heilongjiang	486	133	2,330	53.81	0.239	0.018
Liao He	555	141	1,060	58.31	0.761	0.054
Hailuan He	556	91.5	303	33.46	1.001	0.110
Huang He	468	86.5	842	26.33	0.286	0.031
Huai He	867	234	494	13.34	0.632	0.027
Chang Jiang	1,060	531	2,775	32.87	0.658	0.012
Zhu Jiang	1,547	820	2,836	14.19	0.410	0.005
Zhejiang, Fujian, Taiwan	1,800	1,125	3,715	29.74	0.900	0.008
Southwest China	930	555	32,109	1.64	0.003	0.00005
Inland rivers	149	35.8	5,800	12.84	0.007	0.002
National total	628	276	2,670	30.40	0.323	0.012
World total	800	315	10,400	100.00	0.302	0.010

The water distribution in China favors the south and the economic development favors the east. The regional differences in water pollution are affected by the economic activity and water distribution. The overall trend is that eastern and northern China suffer more severe water pollution as compared to the west and south. Using the 1987 sewage discharge data, the sewage to runoff ratio (Figure 4) and the discharge strength (Figure 5) for the various provinces and cities were calculated. It is clear that the areas suffering from the most severe water pollution are the three municipalities of Beijing, Tianjin, and Shanghai, the two provinces of Jiangsu and Liaoning, and the north China region. Since these regions are China's major energy bases, the rivers are mostly polluted by organic pollutants such as COD, NH₃-N, R-OH (volatile phenol), and CN⁻. In particular, the COD and NH₃-N contents in the Haihe-Luanhe system and the Daliaohe system are higher than the range allowed by the state for ground water. Relatively speaking, the water quality in the mountainous southwest is the best because the water supply is abundant in the southwest, the population is sparse, and the transportation is inconvenient. In the vast, dry northwest where there is relatively little human activity, the water pollution problem is not serious except in major cities in the area, such as Lanzhou, Xian, and Urumqi. However, since the sewage in the drought and semidrought regions in northern China is mostly directly into the fields and some of the waste water containing poisonous elements are treated with seepage pits, the farmlands are polluted, the ground water hardness has increased, and the content of NH₃-N and other poisonous elements has increased. These problems cannot be ignored.

III. Major Policies for Controlling Pollution and Improving Environmental Quality

The ultimate goal for developing production, controlling pollution and improving the environment in socialist

countries is to best satisfy the ever increasing needs of the people in their material and spiritual lives. The environmental pollution problems that exist today are closely related to economic development and are the products of a certain phase of the society's production development. Therefore, to control, improve and protect our environment, we must coordinate and properly treat the relationship between the environment and the regional economic development. Based on the actual situation in China, we should adhere to the following three principles in formulating our strategic policies for environmental protection: 1) Adhere to the principle of simultaneous implementation of the economic, regional, and environmental construction in order to realize the economic, social, and environmental benefits. 2) Adhere to the policy based on prevention and encompasses comprehensive treatment. 3) Adhere to the system that combines environmental planning, control, and management.

1. Comprehensive and Sensible Planning

The composition and geological layout of an ecological system consisting of natural, social, and economic elements have a large effect on the production efficiency and environmental quality of the entire area. We must therefore consider the following guidelines in carrying out regional planning, industrial layout and municipal construction: 1) The needs of social development; 2) compatibility with nature; 3) tolerance of the environment; and 4) availability of financial resources. Facts have shown that one of the main reasons for the deterioration of the environment is population overcrowding and industrial layout. In some regions in China, irrational industrial layout has caused acute environmental problems. This has led to the following results: 1) Incompatibility between the plant distribution and the natural and geographic characteristics. For example, a number of industries that consume large quantities of water were

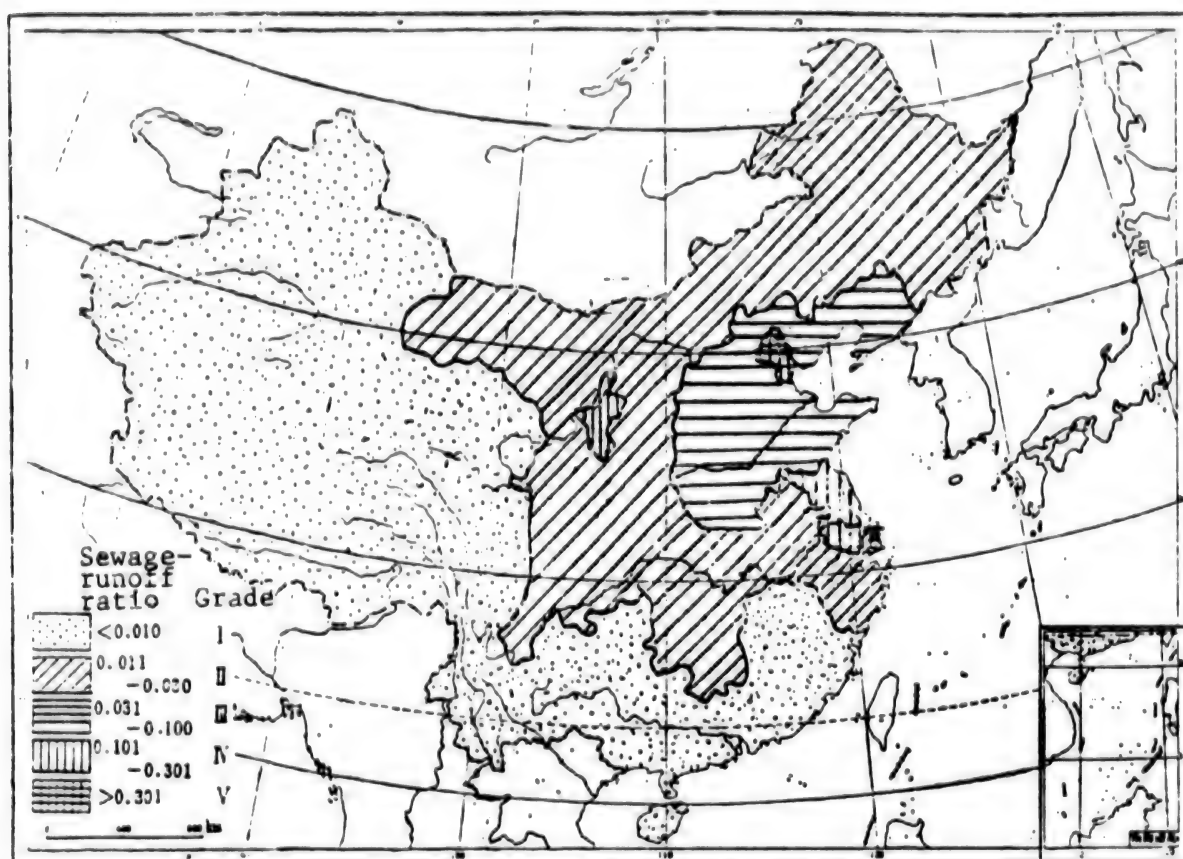


Figure 4. The Grade Scheme of Ratio of Sewage to Runoff in China

built in drought and semidrought regions in northern China. 2) Over-concentration of industries in certain cities without adequate municipal facilities to match. 3) Incompatibility between the industrial production structure and the urban environment. For example, many heavy industries and chemical industries were located in the capital Beijing, and many plants and mines were in residential areas, tourist regions, and major sources of drinking water. 4) Irrational layout within the industry often led to a mixture of the food industry with industries that released poisonous pollutants. This indicates that our cadres and the public did not have a strong sense of the environment. This situation must be corrected as soon as possible. In the future, considerations must be given to the regional characteristics of the environment and the pollutant loading and self-cleansing ability of the environment. Regional planning and the utilization of natural resources must be done in a rational manner. In laying out industrial and agricultural production facilities, we must conduct a comprehensive review of the regional planning, urban planning, industrial development planning and environmental protection planning. The planning must be an integral endeavor so that the goals in production development and environmental protection are both realized.

2. Improve the Technology and Reduce Pollutants

With the exception of large industrial and mining businesses that were imported or designed recently, China does not have pollutant-free or low pollution technology. Many of the large-scale engineering and small and medium businesses built in the 1950's are very primitive in terms of production facility. Many of the recent county and village enterprises are also manually-operated; they are energy intensive, water intensive, and hazardous to the environment. We should seek the opportunity to import the newest technology, reform the production process, and practice closed-loop recycle. Technologies are available for water recycling in agricultural fertilizer production, cyanide-free electrical plating, alkali production via ion-exchange films, alkali recovery in pulping, burning of shaped coal, and wet dust-removal in desulfuring. Based on the actual situation in each production facility, we should encourage the engineers and technicians to make bold innovations and improvements in order to reduce the pollutant discharge to the minimum level. In the meantime, we should join with the current consolidation effort and adjust the raw material structure and the enterprise organization so that the enterprises are capable of controlling the pollutants.

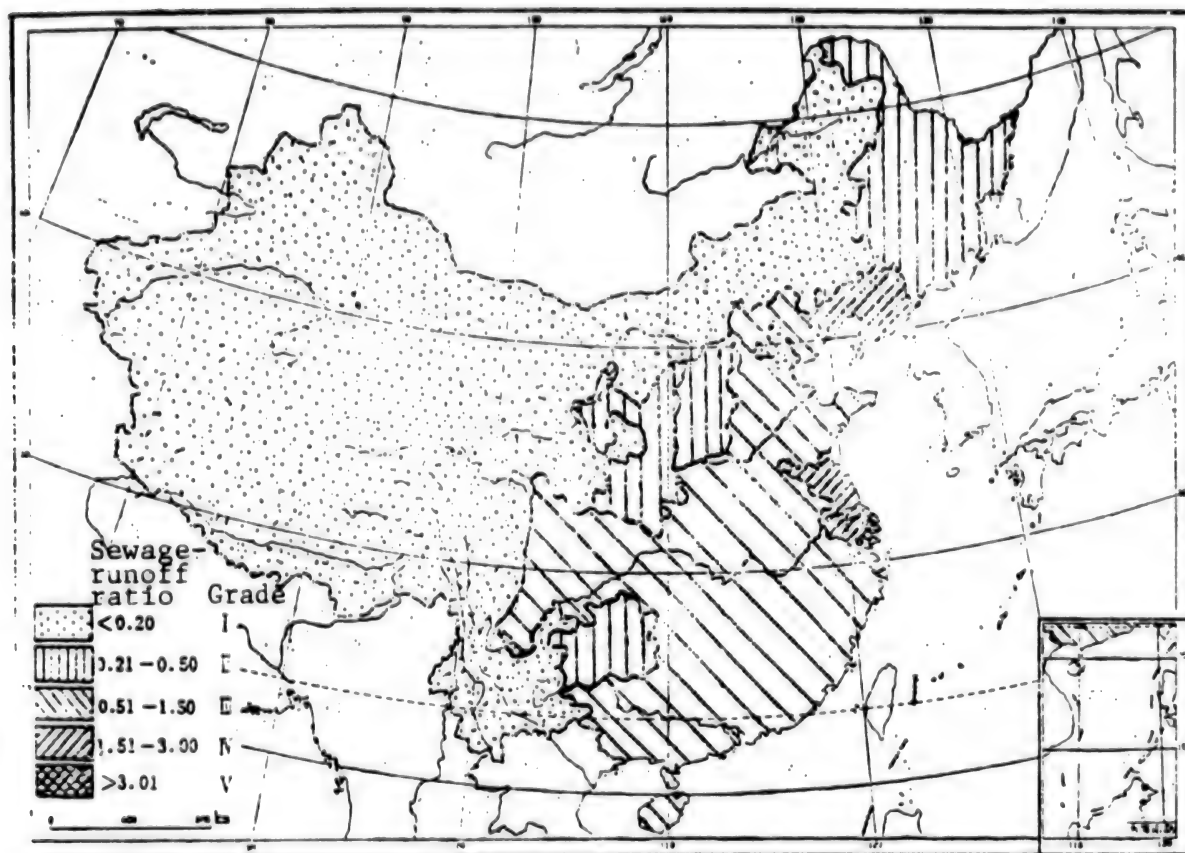


Figure 5. The Grade Scheme of Discharging Strength of Sewage in China

Good practices for us to adopt include centralized pulping and distributed paper making.

Another major technique for improving the production process is to practice unified design and to organize the production chain so that the waste of one plant becomes the raw material of another plant. By doing so, a unified production consortium can be operated with little waste or pollution. With proper design and organization, many of the large, medium and small enterprises, including county and village enterprises, may be linked together to form a greater closed circuit system.

3. Integrated Utilization To Convert Wastes Into Useful Resources

Wastes may be converted into useful resources by applying ecological principles, by simulating the food chain and the principle of material recycle, and by utilizing the material in stages. There have been many examples of success in the utilization of waste water and solid wastes from the cities. In the soil processing system, one may make full use of the biological selective absorption function and biological catabolism, the soil adsorption, and land retention function. By forming a new material recycling system consisting of the producer

(crop or grass), the consumer (earthworm or other animals) and the decomposer (soil microbe), the pollutants can be removed after they enter the crop field or grassland and the water and nutrients are utilized.

Using the same ecological principle, the solid wastes from the cities and the industries and mines may also be sorted in a similar manner. Not only some of the metals can be recovered, other inorganic wastes may also be used for additives in construction and road materials. The reuse of coal dust in thermal electric plants and slag in iron refining have been successful. Organic wastes discharged into the environment by animals and plants may be oxidized and fermented to produce biological energy (methane gas). In the area of waste recycling, China has done a considerable amount of work and made contributions, but the effort can still be made broader.

4. Strengthen the Legislation and Management

The basic principle of our effort is to utilize the resources, develop the economy, and protect the environment. Whether we can manage the relationship between them largely depends on the leadership skill and

management standard. Management is a decision-making process to systematically optimize the action under a multitude of constraining factors. There should be a unified leadership and the necessary legal guarantee. To this end, we should do the following things in the future:

- (1) Improve environmental classification and planning. Based on the particular situation in China, adapt the necessary measures to manage the environment scientifically.
- (2) Improve the control of the total pollutant discharge and gradually establish a system for allowable pollutant discharge.
- (3) Improve the construction of basic urban facilities (including roads, transportation, water and sewage systems, and pollutant treatment). Implement a policy to collect an urban capital construction fee and facility user fee.
- (4) Strengthen the management of environmental monitoring. Monitor the implementation of environmental protection, construction and management via legal processes, economic measures, and administrative steps.
- (5) Based on specific regional function and environmental goals, formulate comprehensive treatment plans, and practice environmental management using regions or watersheds as units.

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State Council Session on Water, Soil Conservation Draft Law

OW1001125391 Beijing XINHUA Domestic Service
in Chinese 0821 GMT 10 Jan 91

[Text] Beijing, 10 Jan (XINHUA)—Premier Li Peng today convened and presided over the 75th session of the executive meeting of the State Council, which discussed "the PRC Law of Water and Soil Conservation (Draft)." The meeting adopted in principle the draft of this law. After some amendments, it will be submitted to the National People's Congress Standing Committee for examination. The draft law clearly stipulates concrete requirements in prevention and supervision of water and soil conservation work, control of the loss of water and soil, the government's role in the work of water and soil conservation, control of the loss of water and soil through reliance on the people and support from the state, as well as the legal responsibility for water and soil conservation. The meeting held that China is a mountainous country, with mountains and hills covering more than two thirds of its territory. Affected by a complicated natural environment and human activities, water and soil losses are very severe. Since the founding of New China, the prevention of water and soil loss in China has achieved marked results under the leadership of the party and the government and with the efforts of millions upon millions of people. However, improvement has so far been accompanied by local destruction, or improvement in one place has been accompanied by destruction in many other places; this situation often occurs in many localities. Severe water and soil losses have resulted in water conservation projects being choked with silt or even destroyed and a rise in river beds. These results not only exacerbate damage from floods, deteriorate the environment, and cause poverty for the people living in areas where water and soil loss is severe, but also affects the economic development in drainage areas to some extent. Therefore, it has become necessary to urge society as a whole to pay high attention to the work of controlling the loss of water and soil. It is extremely necessary and urgent to formulate this law and to strengthen the prevention of water and soil loss with legal means.

State Council Notice on Wildlife Protection

OW1101190391 Beijing XINHUA Domestic Service
in Chinese 0607 GMT 9 Jan 91

["Emergency Notice of the State Council on Strengthening Wildlife Protection and Cracking Down on Those Violating Laws Protecting Wildlife"]

[Text] Beijing, 9 Jan (XINHUA)—To all provincial, autonomous regional, municipal people's governments, and pertinent departments under the State Council:

The Fourth Meeting of the Seventh National People's Congress [NPC] Standing Committee approved and promulgated the "Wildlife Protection Law" in 1988. Since then, all localities have strengthened their leadership

over wildlife protection and launched various propaganda and educational activities. As a result, progress has been made in controlling and saving endangered species and in cracking down on violators. At present, however, wildlife abuse is still very serious. For example, in some localities, leaders pay little attention to protecting wildlife; thus the wanton hunting of rare animals goes unchecked and the illegal trading, reselling, and smuggling of wild animals and their products is on the rise. In other localities, criminals gang up to carry out their schemes, black market trading is rampant, and large quantities of hunting guns, manufactured and sold illegally, flow into society, bringing great harm to wildlife and public order. In an effort to strengthen wildlife protection and deal a heavy blow to violators, an emergency notice is issued as follows:

First, heighten leadership and vigorously publicize and implement the "Wildlife Protection Law." Governments at all levels shall give high priority to wildlife protection and control, and take effective measures to solve problems and enhance their leadership. The propagation and implementation of the "Wildlife Protection Law" shall be an important part in citizens' legal education and in developing spiritual civilization. All media and educational units are to regard the education in and propagation of wildlife protection as their social responsibility and must do their best to publicize the importance of wildlife protection. In addition to the "bird-loving week," all localities shall also hold an intensive campaign of "wildlife propaganda month" each autumn-winter season to help foster a caring society for wildlife.

Second, clamp down on those destroying wildlife. All levels of forestry, public security departments, and administrations for industry and commerce shall investigate and handle all the cases involving illegal hunting, reselling, or smuggling of animals falling under state protection, which have occurred since the "Wildlife Protection Law" was promulgated. Those found guilty, no matter who they are or what units they come from, must be punished in accordance with the NPC Standing Committee's "Supplementary Regulations on Punishing Those Convicted of Poaching and Killing Rare or Endangered Wildlife Under State Protection." No one shall tolerate, yield to, or give shelter to criminals. Typical cases shall be publicized to intimidate criminals and educate the people. Public security, judicial organs, and administrations for industry and commerce shall give high priority to the investigation of wildlife-related cases. Localities severely plagued by such problems shall set a special project in their "anti-crime" drive to deal with those poaching, killing, trading, reselling, or smuggling animals designated for state protection.

Third, strengthen administration over operations involving wildlife and their products. Those engaged in selling, processing, transporting, training, and breeding wild animals under state protection and their products, shall abide by the examination and approval procedures. Administration over the breeding, processing, and trading of wild animals not covered by state protection

and their products shall also be enhanced, and those who want to go into this trade must be approved and registered by administrations for industry and commerce in accordance with the law before beginning their operations. Wild animals under state protection and their products may not be sold on country markets, or purchased and traded beyond provincial, autonomous regional, or municipal boundaries. Guest houses, hotels, and restaurants shall not engage in illegal operations in connection with wild animals under state protection and their products. Permit certificates from the forestry administrative authorities at the provincial, autonomous regional, and municipal levels, or from units authorized by them, shall be secured for the transportation of wild animals and their products.

Fourth, tighten control over hunting guns and ammunition. Control of hunting guns and ammunition is of importance to wildlife protection and public security. Without approval from the Ministry of Forestry, no factories will be allowed to manufacture hunting guns and ammunition; those already in operation shall be ordered by the responsible authorities to stop production. Every store with hunting guns and ammunition shall first secure permission from the forestry and public security departments of the province, autonomous region, or municipality in which it is located, and conduct its business within the area allocated by the forestry administrative authorities. Stores will not be allowed to sell hunting guns and ammunition from unauthorized factories. Any one who wants to purchase hunting guns shall first get permission from the forestry administrative authorities in the county where they live. Upon presentation of the permission document, the county public security agency will then examine and approve the case, and then issue certificates for purchasing hunting guns and ammunition. Public securities departments shall not issue "gun owner's certificates" and forestry administrative authorities shall not issue "hunting certificates" to those who illegally possess hunting guns. Military firearms shall not be used for hunting. Regular inspections shall be conducted, and those found possessing hunting guns illegally or using banned firearms for hunting shall be investigated and their firearms confiscated.

Fifth, enhance control over the import and export of wild animals and their products. Export of wild animals which fall under state protection, or which are restricted for imports and exports under the international pacts of which China is a member, will be controlled. The same restrictions also will be applicable for the products, processed goods, and derivatives of those animals. Any one who wishes to export those animals, their products, processed goods, and derivatives, shall first secure approval from the wildlife administrative authorities of the provinces, autonomous regions, or municipalities where the animals live. With approval, the person may apply for the permission of the Wildlife Administrative Authorities under the State Council, or agencies authorized by it, and acquire "export permit certificates" from

the PRC Administrative Office in Charge of the Import and Export of Endangered Species. Port quarantine, commodity inspection, and customs offices all will conduct quarantine inspections, and issue customs clearances upon presentation of "export permit certificates." Only authorized foreign trade companies may engage in the commercial export of such commodities. Wildlife administrative authorities, administrations in charge of the import and export of endangered species, as well as port quarantine, commodity inspection, and customs offices shall not handle those unauthorized for such trade.

The above notice shall be observed and implemented.
State Council, 8 January 1991

Forestry Ministry Plans Balanced Timber Consumption

OW1301074891 Beijing XINHUA in English
0614 GMT 13 Jan 91

[Text] Beijing, January 13 (XINHUA)—China will strive to balance the consumption and reservation of timber and halt the yearly reduction of wood resources in the Eighth Five-Year Plan period (1991-1995).

The target was announced by Gao Dezhan, minister of forestry, at a national meeting on Saturday.

Gao said the country should also make greater efforts to achieve certain surplus of timber reserves by the year 2000.

To achieve the goal, the minister urged local governments and forestry departments to invest more in advanced technology and scientific management and expand afforested areas and enhance the protection of natural forests.

Talking on the 1991 plan, the minister said that while quickening the steps to expand the scale of afforestation, the ministry will further control the felling of trees and rely on legal means to forestry protection, the paper [as received] reported.

Huangshan Mountain Area in Anhui Uses New Power Sources

OW0601155291 Beijing XINHUA in English
1236 GMT 6 Jan 91

[Text] Hefei, January 6 (XINHUA)—Large hotels and restaurants in the world famous scenic Huangshan mountainous area began using new sources of power including electricity, oil and liquified gas, on New Year's day.

Prior to the use of the new fuels, 2,000 tons of coal was consumed annually in the scenic Huangshan mountainous area. This resulted in the production of over 400 tons of coal cinders, which in turn resulted in damage to the ecological environment and serious pollution which

damaged the area's natural beauty. Gardening departments in the area were required to spend more than 100,000 yuan annually in coal cinder disposal.

The city government invested over two million yuan in the renovation project.

The Huangshan City government has now formulated both short- and long-term environmental protection programs. An environmental protection group consisting of over 200 professionals has been formed. In addition, an experimental garbage disposal site has also been set up in cooperation with the Urban Planning and Designing Institute under the Ministry of Construction.

Henan Provisions on Environmental Protection Projects

91WN0137A Zhengzhou HENAN RIBAO in Chinese
1 Nov 90 p 4

Henan Provincial Regulations Governing Environmental Protection in Construction Projects, passed at the 18th Session of the Standing Committee of the Seventh Provincial People's Congress on 27 October 1990.

[Text] Proclamation No. 4 of the Standing Committee of the Henan Provincial People's Congress

The "Henan Provincial Regulations Governing Environmental Protection in Construction Projects," passed at the 18th Session of the Standing Committee of the Seventh Provincial People's Congress are hereby promulgated and shall come into force on the day of promulgation—27 October 1990.

Chapter 1: General Provisions

Article 1: Enactment of the present regulations is based on the provisions of the "Environmental Protection Law of the PRC" and of other relevant state laws and regulations, in integration with the actual conditions of Henan Province, in order to enhance environmental protection in construction projects, control new pollution, accelerate correction of existing pollution, protect the health of the people, and to promote development of the national economy.

Article 2: The present regulations shall apply to all new construction, reconstruction, extensions, building removals, and cases of technological transformation, as well as to all regional development projects within the territory of this province that affect the environment (hereafter "construction projects").

The term "affecting the environment" as used in these regulations refers to damage, caused by pollution, to the environment, natural resources, and the ecosystem caused during construction or in the production processes or use of construction projects.

Article 3: All construction projects must undergo environmental impact assessment.

Article 4: Pollution prevention installations must be planned at the time as the main installations are planned; they must be completed at the same time, and must be put into operation or use at the same time as the main installations.

On completion of a construction project, pollution caused by the project must be within standards prescribed in state or provincial regulations and must conform to the provisions of all environmental protection laws and regulations.

Article 5: Imported technologies and equipment must conform to all relevant state and provincial environmental protection provisions and must be environmentally friendly.

Imported technology or equipment that causes pollution which cannot be corrected by domestic technology or equipment must simultaneously be accompanied by imported antipollution technology or equipment appropriate to the case.

Contracts for the importation of technology or equipment must contain provisions on environmental protection which clearly define the obligations and responsibilities of all parties concerned in respect to environmental protection.

It is forbidden to import technologies and items of equipment which do not meet the demands for environmental protection prescribed by Chinese provisions.

Article 6: Units or individuals must not transfer seriously polluting technology or equipment to other units or individuals who do not have pollution-preventing capability.

If a construction project has to be transferred that has originally been discharging pollutants, the construction unit must adopt measures to prevent creating new pollution.

Article 7: The administrative departments of the people's governments of county and higher rank charged with the protection of the environment (hereafter called "environmental protection departments" [EPD's]) shall exercise unified supervision and control of environmental protection in all construction projects.

Administrative departments in charge of planning, economics, science and technology, construction, designing, land, town and township enterprises, monetary affairs, materials, water conservancy, mining, public health, cultural, and industrial-commercial affairs must, according to the provisions of the environmental protection laws and regulations of the state, each accept responsibility within its jurisdiction, must closely cooperate, and must effectively as a joint effort perform environmental protection work in connection with construction projects.

Article 8: Every unit and every individual has the duty to protect the environment, and has, furthermore, the right

to inform on or accuse any unit or individual that may violate the present regulations.

Article 9: Any unit that has distinguished itself or any individual who has distinguished himself in the implementation of the present regulations shall receive a commendation or reward from the people's government or the EPD.

Chapter 2: Environmental Impact Assessment

Article 10: Whenever a construction unit is compiling and submitting a proposal for a construction project, it must submit a report to the EPD at the place where the project is to be located, explaining in concise form the environmental impact which the project construction, or production from it after its completion, will possibly have on the environment in view of the nature, the production technology, or the scale of the construction in question.

Before approving a construction project, the planning, economic affairs, and the science and technology departments must solicit the opinion of the EPD at the equivalent administrative level. Whenever a document of approval concerning a project is returned from higher to lower authority, a copy shall be sent to the EPD at the same administrative level and to the EPD at the place of the intended construction project.

Article 11: At the time of the feasibility study of a construction project, the construction unit must entrust an assessment unit with the assessment of the environmental impact of the construction project, and have it make out an environmental impact report or complete an environmental impact schedule.

The provincial EPD shall compile and publish a "List of Items That Seriously Pollute the Environment or Destroy the Ecology" (hereafter "the list"), according to laws, regulations, and relevant provisions of the state.

Construction projects which are on the list, or, without being on the list, are known to the provincial EPD to have a serious impact on the environment, require an environmental impact report. Construction projects that are not on the list may complete an environmental impact schedule.

Article 12: The department in charge of a particular construction project is responsible for the preliminary examination of its environmental impact report (schedule). The department in charge of the construction project shall, within 15 days from the receipt of the impact report (schedule), submit a preliminary opinion of its examination to the EPD responsible for approval, and also to the EPD at the place of the intended construction project.

The EPD responsible for approval of the project shall give its official decision within one month from the day of receipt of the environmental impact report (schedule), and of the preliminary examination opinion of the

department in charge of the construction project. Official examination and decision on large and important construction projects must not exceed two months. Projects to which no objections have been raised and for which no official decision has been forthcoming within the prescribed time shall be considered approved.

The EPD responsible for examination and decision on approval of the project shall also be responsible for the conclusions contained in the environmental protection report (schedule).

Article 13: Apart from cases, which according to provisions of state law, have to be examined and decided upon by the State EPD, authority to examine and decide on environmental impact reports (schedules) within this province shall be limited as follows:

1) The provincial EPD shall examine and decide on the following environmental impact reports (schedules) for construction projects:

(a) Environmental impact reports for construction projects above an amount to be determined by the provincial EPD in conjunction with the provincial planning and economic affairs departments;

(b) Environmental impact reports (schedules) for construction projects that extend beyond one municipality (prefecture);

(c) Environmental impact reports (schedules) for which the state has prescribed that they be examined and decided upon by the provincial EPD.

2) Municipal (Prefectural) EPD's shall examine and decide on the following environmental impact reports (schedules):

(a) Environmental impact reports for construction projects below an amount to be determined by the provincial EPD in conjunction with the provincial planning and economic affairs departments;

(b) Environmental impact schedules for construction projects examined and approved by planning and economic affairs departments of municipal (prefectural) or higher level;

(c) Environmental impact schedules for construction projects extending beyond one county (municipality, region).

3) Environmental impact schedules for construction projects not covered by the preceding two paragraphs may be examined and decided upon by the county (municipal, region) EPD's.

Examinations and decisions made by offices beyond the prescribed jurisdictions for such shall be invalid.

Article 14: An EPD at a higher administrative level may entrust an EPD at a lower administrative level to examine, decide upon, and judge construction projects as acceptable. The EPD at the higher administrative

level has the right to reexamine and to revise the previous decision with regard to construction projects which it had entrusted a lower EPD to examine and decide upon.

In case a dispute arises about an environmental question and in case special demands are made on the environment by a particular construction project, the environmental impact report may be submitted to an EPD at a higher administrative level for examination and final decision.

Article 15: All relevant documents in connection with environmental impact reports (schedules) examined and decided upon by municipalities (prefectures) and counties (cities, regions) shall be submitted within five days after the decision has been made to the EPD at the higher administrative level to be placed on record with them. If the EPD of the higher administrative level believes the decision of the EPD at the lower level conflicts with any law or regulation, it must order the EPD at the lower level to rectify its decision.

Copies of all documents in connection with environmental impact reports (schedules) must be sent to the EPD at the place of the construction project, and also to all relevant departments at the same administrative level in charge of planning, economic affairs, construction, banking, land administration, and industrial-commercial affairs.

Article 16: In case of changes in the nature, production technology, scale, or construction site of the construction project, the construction unit concerned shall submit a revised environmental impact report (schedule), which shall be reviewed according to the prescribed examination and approval procedures.

Article 17: Environmental impact reports for construction projects shall be compiled only by a unit that are in possession of a special "license for environmental impact assessments of construction projects." Environmental impact schedules shall be completed only by a unit that has specially obtained a "license for environmental impact assessments of construction projects," but may also be completed by the unit that has carried out the design for the project involved or by a unit authorized by the an EPD of municipal (prefectural) or higher level.

Administration and control of "licenses for environmental impact assessment of construction projects" shall be carried out according to relevant regulations issued by the state's environmental protection department.

The assessment unit shall be responsible for the conclusions contained in its environmental impact assessment.

Article 18: In case a construction project requires compilation of an environmental impact report, the assessment unit shall first compile an assessment outline. This shall be submitted by the construction unit to the EPD, that will have to approve the environmental impact

report, and only after its examination and approval of the outline may actual assessment work be started.

Article 19: The tariff of charges for the environmental impact assessment of construction projects shall be determined by the provincial EPD in conjunction with other relevant departments, in accordance with relevant state regulations.

Expenses in connection with environmental impact assessment work shall be defrayed as an initial expense of the construction project.

Article 20: Every construction unit shall compile a statement of design tasks regarding the construction project on the basis of the opinions arrived at in the examination and approval of the environmental impact report (schedule). Improvement of ongoing pollution from a project that entails reconstruction, expansion, or that is to be subjected to technological transformation shall also be mentioned in the design task statement.

Article 21: Whenever a construction unit submits its design task statement to the planning department, it must at the same time submit all documents concerning the examination and approval of the environmental impact report (schedule).

For any construction project that is still without an environmental impact assessment, or whose environmental impact report (schedule) has not yet been approved, the planning department must decline examination and approval procedure for the design task statement, as the town and township enterprise affairs department must refuse approval of its enterprise license, the land affairs department must refuse to institute land allotment procedures, banks must refuse loans, and industrial-commercial affairs departments must refuse to institute relevant licensing procedures.

Chapter 3: Site Selection and Construction

Article 22: Sites for construction projects must be selected in conformity with the demands of environmental protection plans and environmental laws and regulations. The sites selected must be appropriate, their layout must be sensible, and they must be selected with a minimal impact on or harm to the environment.

In areas where serious pollution had occurred, or where the ecosystem has been seriously damaged, no project shall be constructed that could have an impact on the environmental condition of the place, until the environmental quality of the place has been improved beforehand.

It is strictly forbidden to construct industrial production facilities which pollute the environment or destroy its ecosystem in places designated by the State Council, by relevant departments of the State Council, or by the Provincial People's government as scenic spots, places of historic interest, nature conservation areas, or places deserving special protection.

For places where there are sources of drinking water and water for other livelihood needs, where bodies of water are located in scenic spots or places of historical interest, where bodies of water are important for the fishing industry, or where bodies of water are of special economic or cultural value and designated as protected areas by a people's government of county or higher level, the approval and administrative control of construction projects must be carried out according to the relevant laws, regulations, and rules of the state.

Article 23: The selection of a site for a construction project may be reported for approval only after an EPD has participated in the selection process and after obtaining its signed opinion.

Article 24: The construction unit must entrust the design unit with drawing up the initial design in accordance with environmental protection standards and provisions, and according to the approved environmental impact report (schedule).

The design unit must, with due consideration for the standards and legal provisions for the protection of the environment, compile an "environmental protection script," implementing concretely the opinions expressed at the examination and approval of the environmental impact report (schedule), and it must accomplish the task of designing pollution prevention installations at the same time as it designs the main engineering project.

The design unit must not start designing construction projects before their environmental impact reports (schedules) have been approved by the EPD.

Article 25: After completion of the initial design, the construction unit must complete a "construction project environmental protection design examination form," and must submit the "environmental protection script" and all relevant documents for examination to the EPD which is responsible for the examination and decision on the environmental impact report (schedule). The EPD must within one month give its official reply or present an opinion.

Without prior examination by the EPD of the "environmental protection design script," the planning and economic affairs departments and the department in charge of the construction project must not take action on the initial design.

In case the construction unit changes the environmental protection design, which had been previously approved, a new report has to be submitted for official decision.

Chapter 4: Execution and Acceptance

Article 26: Before starting work on the actual construction, the construction unit must have obtained a "construction project environmental protection design examination form." Without it, the relevant department must refuse to approve the start of work report.

Article 27: The construction unit must include all pollution prevention engineering work in the work execution plan, and start on such work at the same time as starting on the main engineering work. It must also ensure that all pollution prevention installations will be completely in place before the main engineering work is put into production or taken in use.

When the construction unit will submit its progress report for its construction project to the planning department, it shall at the same time report its work on pollution prevention installation to the EPD at the place of construction.

Article 28: The department in administrative control of the construction project and the environmental protection authorities shall periodically check the work on pollution protection installations and on the conditions of capital expenditure. If work is not executed according to plan documents or according to the work execution plan, they shall order the construction unit to effect corrections.

Article 29: In the process of construction, the work unit shall adopt measures to protect the environment around the construction site, to prevent or reduce pollutions, such as by noise, dust, and turbulence, and also destruction of natural environment. Such as water sources, flora, scenic views, etc. The work unit should also repair and rectify any pollution or destruction that has already taken place.

Article 30: After completion of the construction project, its pollution prevention installation shall be tested at the same time as the main engineering work is tested. The construction unit will generally within the first three months of testing entrust a unit qualified to monitor environmental conditions to do further monitoring, which unit will then present a "report requesting acceptance of the pollution prevention installation" to the EPD that is responsible for approving the environmental impact report (schedule). The EPD shall within one month complete its final inspection and acceptance.

Article 31: After the pollution prevention installation will have been tested and accepted as up to standards and after a "certificate of testing and acceptance of pollution prevention installation" will have been obtained, the construction project may start up production or be taken in use.

Chapter 5: Legal Responsibilities

Article 32: In case of violation of the present regulations by one of the below-listed acts, the EPD responsible for the examination and approval of the construction project environmental impact report (schedule) shall suffer the following penalties, depending on the severity of the case:

1) In case a construction project is started without proper authority before an environmental impact report (schedule) has been prepared or without obtaining approval for

the preliminary "environmental protection design script," work shall be ordered stopped, and the required procedure shall be made up. If the case involves a construction project that requires compilation of an environmental impact report, a fine of from 5,000 to 20,000 yuan may be imposed on the construction unit. If the case involves a construction project that requires completion of an environmental impact schedule, a fine of from 1,000 to 5,000 yuan may be imposed on the construction unit. The executive officer of the construction unit may be fined from 50 to 200 yuan.

2) In case of a violation by the design unit with regard to documents concerning design examination and approval, or concerning the EPD's opinion following examination or the designed scale, causing pollution prevention measures to be omitted or to be wrongly designed, resulting in pollution or destruction of the environment, a fine may be imposed on the design unit of from one to five percent of the design charge for the construction project in question, and it may be ordered to correct the original design. The executive officer of the design unit may be fined from 50 to 100 yuan.

3) In case an assessment unit is guilty of fraud or deception in its assessment, its entire income from such assessment may be confiscated; if the seriousness of the case warrants, its assessment license may be rescinded according to relevant provisions.

4) In case a construction project was completed and has started up production or has been taken in use while its pollution prevention installation was not yet completed, it shall be ordered to stop production or use and also ordered to complete its pollution prevention installations within a set time limit. A unit that has thus prematurely started up production or use may be fined from 5,000 to 50,000 yuan.

5) In case a construction project was put into production or taken in use without having its pollution prevention installations tested and accepted, or when its tests have shown them to be not up to standards, its production and use shall be ordered stopped, and it shall be ordered to make up the necessary procedures; the construction unit or the unit having put it into production or taken it in use may together be fined from 5,000 up to 20,000 yuan.

6) In case production technology or equipment, which causes serious pollution is transferred to be used by a unit or individual without pollution prevention capability, its use shall be ordered stopped, and the unit effecting the transfer of the technology or equipment that causes serious pollution shall be fined from 1,000 to 20,000 yuan. The executive officer of the unit may be fined from 100 to 300 yuan.

7) In case technology or equipment is being imported which does not meet the demands of state or provincial environmental protection provisions, its use shall be ordered stopped, and the construction unit involved may be fined from 3,000 to 30,000 yuan.

8) Anyone who refuses to allow the EPD to carry out on-the-spot examination, or who passes the examination by fraud and deceit, shall be given a warning or shall be fined from 300 to 3,000 yuan.

The EPD of a county level people's government may impose fines up to 10,000 yuan. Fines of over 10,000 yuan must be referred to the EPD of the next higher level for approval.

Article 33: Revenue from fines or confiscations must be turned over to the finance departments, and shall be allocated to the EPD having imposed the penalty, to be used in the general control of environmental pollution.

Revenue from fines and confiscations shall be administered as special fund, it will not be part of funds distributed within the organizational system. The said special funds are rather to be used for their special purpose. Any surplus at the end of the year shall be carried forward for use in the next year.

Revenue from fines and confiscations must be used for the prescribed purpose, and must not be diverted to other uses. The financial and auditing departments, and the EPD's must strengthen their supervision of the use of revenue from fines and confiscations. Violators will be punished according to relevant legal provisions.

Article 34: If a construction project, in the course of construction, moves originally extant pollutants to now cause environmental pollution, it shall be ordered to rectify the situation within a set time limit, and the construction unit shall be penalized according to relevant laws and regulations.

Article 35: EPD personnel and personnel of other relevant departments who violate the provisions of the present regulations, misuse their powers of office, are guilty of dereliction of duties, or who bend the law for selfish motives, shall be punished by administrative

penalties to be imposed by their own unit or by the authority at the next higher level. If the action constitutes a criminal offense, criminal responsibility shall be investigated according to law.

Article 36: In case a party refuses to accept the administrative penalty that has been imposed, he or she may appeal the decision to the authority at the next higher level above the organ which has imposed the penalty, within 15 days from receipt of the notification of the penalty. Anyone who refuses the decision on his or her appeal, may file suit with a people's court, within 15 days from receipt of the decision on his or her appeal. Any party may also directly file a suit with the people's court in accordance with the provisions of the law. If a party has not filed an appeal within the prescribed time limit, also not filed suit with a people's court, also refuses to pay the imposed penalty, the EPD that has imposed the penalty may request the people's court to effect compulsory execution.

Chapter 6: Supplementary Provisions

Article 37: Interpretation of questions arising in the specific applications of the present regulations will be a responsibility of the Henan Provincial EPD.

Article 38: In case of a conflict between the present regulations and any provisions of Henan Province relating to environmental protection in construction projects, which have been in force prior to the promulgation of the present regulations, the present regulations shall prevail.

Article 39: The present regulations shall come into force on the day of their promulgation. The "Henan Provincial Regulations Governing Environmental Protection in Construction and Technological Projects," adopted at the Eighth Session of the Standing Committee of the Fifth Henan Provincial People's Congress on 12 November 1980, are hereby repealed.

INDONESIA

Government Opposes Dumping of Industrial Waste on Islands

BK1301064191 Jakarta ANTARA in English 0441 GMT 13 Jan 91

[Excerpt] Jakarta, Jan 13 (OANA-ANTARA)—Indonesia will not let its about 17,000 islands be dumped with hazardous industrial waste from other countries, an official has said.

Nabiel Makarim, deputy head of the Environmental Impact Control Agency (Bapedal) for environmental pollution control, said here over the weekend that the possible dumping of hazardous waste by other countries in the future had drawn the Indonesian Government's attention.

Nabiel was reacting to proposals from foreign companies to dump their waste into Indonesia. He said in the last three months four companies, most of them foreign companies, made a request to the Ministry of Environmental and Population Affairs for the dumping of hazardous waste in the country.

We never allow them despite a number of reasons, Nabiel, concurrently the third assistant to the minister of environmental and population affairs, said. [sentence as received]

Bapedal was established on July 5, 1990 with the appointment of Minister of Environmental and Population Affairs Emil Salim as the agency head and Nabiel Makarim and P.L. Courtier as deputy heads.

The agency has major tasks to help the president implement life environmental impact system, which includes matters relating to efforts to avert natural destruction and rehabilitate degraded environment.

Nabiel further said the agency would work closely with the Indonesian Navy (TNI-AL) in guarding against the dumping of hazardous waste by other countries into any one of Indonesia's islands. [passage omitted]

SOUTH KOREA

Ministry To Spend \$12 Billion To Clean Environment

SK0401085491 Seoul YONHAP in English 0712 GMT 4 Jan 91

[Text] Seoul, Jan. 4 (YONHAP)—The Environment Ministry announced Friday that it will spend nearly 12 billion U.S. dollars over the next five years to clean up the air, soil, rivers and seas.

The ministry will seek legislation authorizing it to fine polluters and use the money it thus raises for environmental protection, officials said.

The mid-term plan targets eight areas for the cleanup and maintenance drive—the air, tap water, waste, soil, the seas, the natural environment, environmental science and environmental protection.

Of the 8.378 trillion won (11.72 billion dollars) budgeted for the project, 3.26 trillion won (4.56 billion dollars) will come from the private sector, they said.

Most of the money is allocated to cleaning air and tap water, and to improving waste disposal.

A highlight of the project is an anti-air contamination measure, to cost 3.128 trillion won (4.37 billion dollars), that will expand the use of liquefied natural gas (LNG) and low-polluting automobiles.

LNG use will rise from 2.01 million tons in 1989 to 2.7 million tons in 1992 and 4 million tons in 1995.

This year, LNG will be made mandatory for all 99-square-meter to 112-square-meter apartments in Seoul, and its use will be expanded to smaller apartments next year.

In 1995, LNG will be available in other major cities such as Pusan, Taegu, Taejon, and Ulsan, the officials said.

Vehicles equipped with catalytic converters to reduce emissions accounted for 53 percent of the 1.4 million vehicles on Korea's [?highways] at the end of 1989, but the level will be increased to 96 percent by 1995.

Water purification will soak up 2.99 trillion won (4.19 billion dollars) for improvements of waterworks and sewage systems, the ministry said.

The BOD (Biological Oxygen Demand) at Paldang Lake, a major source of tap water for the Seoul area, will be improved from 1.2 ppm [parts per million] in 1989 to 0.8 ppm in 1995. Taechong Lake, the primary water source for the mid-section of the country, will improve its BOD from 1.6 ppm 1989 to 1.2 ppm in 1995.

For waste processing, the ministry is setting aside 2 trillion won (2.79 billion dollars) for better recycling, incineration and burial systems, the officials said. Household waste burial will increase from 14.4 percent in 1989 to 61.4 percent in 1995, and the incineration rate will rise to 15.3 percent from 1.9 percent for household waste and six percent from 3.3 percent for industrial waste.

Ministry To Study Radioactive Waste Control Issues

SK1401151091 Seoul THE KOREA ECONOMIC JOURNAL in English 14 Jan 91 p 4

[Text] The Ministry of Science and Technology will prepare in 1991 a five-year plan to promote research in basic science at academic institutions.

The ministry will increase investment in government-sponsored research and development projects at government and industrial laboratories.

In addition, the ministry will draft a master control plan for radioactive waste of atomic power plants to cope with the public's increasing concern about such waste. The master plan will include a program to dispose of medium- and low-grade radioactive waste and another for establishing a radioactive waste control fund. It will call for establishing rules governing the transportation of radioactive materials.

LAOS

Forestry Concession in Vientiane To Be Amended

BK1601123291 Vientiane KPL in English 0901 GMT
16 Jan 91

[Text] Vientiane, Jan 16 (KPL)—The Agriculture and Forestry Service of Vientiane Province on January 11 convened a meeting of owners of state-run and private saw mills and representatives of 14 forestry business companies. Vientiane Province this year plans to make amendments to forestry concessions and to put an end to the compromise allocation of timber for housing construction. This central province, over the previous years, has been faced with arbitrary and unorganised logging and opportunist acts of some bad elements.

In furtherance of the suggestions of the governor of Vientiane Province and of the Ministry of Agriculture-Forestry, the Forestry Management and Protection Organisation in mid December was authorised to control the operation of forestry business in that locality. Since then, the organisation has made inspections of illegal tree felling and issued an order to completely end the operation of local small saw mills in accordance with the regulations of the new management.

Through the practical inspections and exchange of views, the meeting worked out regulations on forestry concessions viewed as an urgent problem to be tackled. Still, the meeting unanimously agreed that no more permission be made to requests for wood extraction for housing construction. The meeting also dealt with the bad consequences of forestry destruction badly harmful to the environment for the time being and in the future.

In realizing the necessity, the forestry companies were demanded to re-set their quotas in logging in compliance with the quota provided by the Council of Ministers to the Vientiane Province. 20,000 cubic metres of wood extraction is offered to this province, including 15,000 cubic metres of new felling and 5,000 of already felled wood.

THAILAND

Paper Views Industry Ministry Decision on Pollution Controls

91WN0138B Bangkok BAN MUANG in Thai
10 Nov 90 p 2

[Editorial: "Thai Pollution Control Devices"]

[Text] The Ministry of Industry told the cabinet that in view of the present situation, this is not the time to require the installation of smog control devices on all vehicles, because these devices must be used on cars that run on unleaded gasoline. As for vehicles that have diesel engines, steps should be taken to get the users to keep the engines tuned in order to reduce the pollution problem somewhat.

As for reducing the lead in gasoline, the Ministry of Industry has stipulated that the amount of lead in gasoline must be reduced from 0.40 grams per liter to a maximum of 0.15 grams per liter by the end of 1993. Also, the amount of sulfur in high-speed diesel fuel must be reduced from one percent to 0.5 percent by weight by the end of 1993.

As for reducing air pollution from motorcycle exhaust, the Ministry of Industry is discussing the suitability of engines with the Industrial Council of Thailand, and it is stipulating industrial products measures for "roast mok" gasoline for use by 2-stroke type motorcycles in order to reduce the white exhaust.

The cabinet passed a resolution designating the Ministry of Science, Technology, and Energy as the main organization in formulating a plan and holding conferences with the units concerned in order to install air pollution control devices on vehicles. The Ministry of Commerce must take steps to procure unleaded gasoline and diesel fuel containing less sulfur as soon as possible.

This means that with respect to eliminating air pollution from engines and vehicles, Thailand cannot do this at this time. This will have to wait until the amount of lead in gasoline can be reduced to the point where pollution control devices can be used. Moreover, the price of gasoline is now rising. Reducing the amount of lead in gasoline will cause gasoline prices to go even higher, which will cause even more problems for users. Thus, we will have to continue using leaded gasoline, which poses a threat to people's health.

As for reducing the amount of black smoke and poisonous substances emitted by exhaust pipes and engines, Thais have invested certain types of equipment to filter the black smoke and poisonous substances. This equipment is not very expensive, and it is easy to install. If the invention of suitable types of equipment is promoted and such equipment is put into widespread use, production costs will decline greatly. The units responsible should support such production and require the use of this equipment. To do this, we don't have to wait until

the amount of lead in gasoline is reduced, which will continue to be a problem for a long time to come.

High Rate of Pesticide Poisoning Reported

91WN0138A Bangkok SIAM RAT in Thai 5 Nov 90 p 3

[Excerpt] [Passage omitted] Priya Kasemsan Na Ayuthaya, the director-general of the Department of Medical Sciences, disclosed that the use of chemical pesticides by farmers in Thailand is still a problem. Too much is being used, and the amount used has not declined. This is because most farmers lack knowledge and do not understand how to use pesticides correctly. This is posing a threat to the health of the users and consumers and destroying the environment.

A report by the Ministry of Public Health states that each year, more than 4,000 people become ill from pesticide poisoning. That is approximately 7.7 people per 100,000 people. Of these, approximately 0.8 percent, or 30 people, die. About 95 percent of those who become ill are of working age, and their chances of coming in contact with the poisonous substances are very great. That is, they are 25-34 years old. This is followed by those 10-24 years old. The northern region has the largest number of cases, 15.53 per 10,000 people. This is followed by the central region, with 11.48 cases per 100,000 people [as published]. The provinces with the highest number of patients are Pathum Thani, Kamphaengphet, Sukhothai, and Phetburi provinces.

In order to help solve the problem of chemicals being used improperly in agriculture, the Department of Medical Sciences will conduct a training program on "The Proper Use of Chemicals and the Use Alternate Substances in Agriculture" during the period 5-9 November at the Settlement Training Center, Office of the Civil Service Commission, in Sai Noi District, Nonthaburi Province. The purpose of the seminar is to disseminate knowledge about how to use agricultural chemicals correctly and safely and about the dangers of agricultural chemicals. Another topic will be the use of alternate methods in place of using chemicals, including using herbal plants and biological methods. Basic public health models will be used by training instructors A and B in four model provinces, that is, Nakhon Sithamarat, Nakhon Ratchasima, Lamphun, and Pathum Thani provinces. [passage omitted]

Chao Phya River Pollution Problems

91WN0176A Bangkok BANGKOK POST in English
15 Nov 90 p 31

[Article by Tunya Sukpanich: "How We Treat the River of Kings"]

[Excerpts] Garbage, all types of waste water, chemical residues from communities and industries... all continue to be discharged daily into the Chao Phya River.

We repay our debt of gratitude to the river that provides life and happiness by returning to it more than 180,000 kilograms of waste each day.

According to the water quality monitoring report of the National Environment Board and the Public Health Ministry, the lower part of the Chao Phya has reached the crisis stage. Meanwhile, water quality in the upper and central part has become degraded as years go by. [passage omitted]

Beginning from Nakhon Sawan Province, the upper and central sections of the river start to be contaminated mainly by agricultural chemicals and livestock waste.

According to Dr. Arun Sorathet, chairman of the National Science Association, such chemical residues can persist in the environment for a long time. They cause an increase in incidence of single-cell algae in the river. Consequently, the waterworks authority has to bear a high expenditure in eradicating such algae before using river water for tapwater production.

"Chemicals also poison the most fertile natural breeding place at the river estuary, leading to a decrease in fish stocks in the Gulf of Thailand as well," he said. In addition, a large number of golf courses using huge quantities of fertilisers, herbicides, and pesticides also lead to serious water contamination through rainwater run-off.

The river's condition is growing worse each year. The dissolved oxygen count (DO), a measure of the oxygen level in the water, is used to indicate the pollution level by telling us whether any living thing might be able to exist in the water or not.

Each year, the DO level is lower and lower. In the upper and central parts of the Chao Phya River, it dropped below the international standard 5 years ago, while in the lower stretch it has been below the standard for more than 10 years already.

Meanwhile, the biochemical oxygen demand, known as the BOD load, of both factories and communities has risen higher, particularly in the lower part of the river.

"At present, at Tambon Sam Lae in Pathum Thani Province, where water is pumped up for tapwater production to serve people in Bangkok and nearby provinces, the water quality is also below standard, with the high level of BOD," he said.

Last year, the coliform bacteria count in the Chao Phya River reached 1,362,500 MPN per 100 millilitres at the entrance to Klong Phra Khanong. Mahidol University has found, meanwhile, that at least 12 canals in Bangkok are seriously contaminated with *Vibrio leptospira*, which causes serious diarrhoea. In addition, the hepatitis A virus and *Candida albicans*, which cause skin disease, are found in Klong Sam Sen and Klong Saen Saeb.

Another indicator of the polluted condition of the river is contamination by heavy metals. The Public Health

Ministry survey indicates lead contamination in the central and lower parts of the river.

In the upper part of the river, such hazardous chemicals as Deldrin have been found in the water. Two years ago, a high rate of Deldrin was found in tapwater resources at Tambon Sam Lae of the Pathum Thani Province.

During the past few years, an official report says, residential communities have been responsible for 40 percent of waste water released into klongs and the Chao Phya in Bangkok; the industry share is put at 25 percent, while the service business, including hotels, restaurants, and condominiums, is said to be responsible for another 32 percent; the remainder comes from other activities.

As a result of such findings, the main emphasis in central waste-water treatment has been on residential communities, while the industrial sector has been left in the hands of the Industry Ministry; no new measures have been enforced to convince or to compel factories to treat their waste water before discharging it into open waterways.

It may be argued, however, that the 25 percent of waste produced by the industrial sector can be deadly toxic to the river and to human beings as well as to agricultural crops.

"Industrial waste includes deadly chemicals and heavy metals such as cadmium, lead, or zinc," said Dr. Dhira Panthumvanit of Thailand Development Research Institute, explaining that some 95.5 percent of toxic waste comes from factories while another 0.5 percent comes from hospitals.

He continued with the worrying assertion that within the next 10 years, it is estimated that toxic chemicals and heavy metals will increase to three times the present rate.

As a rough estimate, Dr. Dhira calculated the economic loss due to water pollution in canals and the Chao Phya River to be about 1,100 million baht, a loss felt mainly in land prices and the need for processing systems to clean the water. The health impact, however, is only 0.65 percent, he said.

"This does not include the ecological loss represented by the disappearance of several types of fish in the river. Small-scale fishing by people living along the waterways simply became impossible long ago," he said.

Who will pay for this loss? The "Polluter Pays" principle has been promoted in Thai society for a few years already. But so far, nothing has been done to push through this principle to the extent of implementation, apart from a few isolated cases.

Pattaya City did issue a regulation requiring big business to pay for waste-water treatment facilities. But it failed. To attract business participation once again, the Pattaya City recently issued a new regulation but with a lower rate.

Dr. Thongchai Pansawat, of Chulalongkorn University, pointed out that the recent survey in certain areas of Bangkok shows that very few people are willing to pay for the cleaning-up canals in the vicinity of their homes.

The "Polluter Pays" principle has been instituted in some industrial estates, where factories make payments to the estate administration to cover the cost of wastewater treatment. In addition, the central treatment plant for sugar factories in Kanchanaburi Province, run by the government, has also for some time collected fees from factories that have been polluting the Mae Klong River. The same thing has been done with leather factories in the Samut Prakan area.

Under the "Beneficiary Pays" principle, whoever benefits most must pay more—especially such establishments as hotels, condominiums, and restaurants along the riverside.

"At present there are at least 10 hotels, both existing and planned, some 17 condominium projects, a large number of restaurants, some 105 piers, 30 express boats, and at least 1 million tourists a year touring the river," Dr. Dhira said. [passage omitted]

VIETNAM

Reforestation Planned in Northern, Central Mountain Provinces

BK0201112191 Hanoi VNA in English 0718 GMT
2 Jan 91

[Text] Hanoi VNA Jan 2—In the next ten years, the six mountain provinces in the northwestern and central parts of North Vietnam plan to grow 1.5 million hectares of new forest for both protective and economic purposes.

This was announced at a meeting held in Hoa Binh Provincial Town, Ha Son Binh Province, from December 28 to 30 1990 by the Ministry of Forestry with the participation of representatives of the provinces of Lai Chau, Son La, Ha Son Binh, Hoang Lien Son, Ha Tuyen and Vinh Phu, on forestry development as a main direction for local socioeconomic development.

The six provinces have a total of 63 districts or equivalent administrative units with a total natural area of more than 6.6 million hectares, of which only 21 percent are still covered by forests, and a population of four million inhabitants of 40 ethnic groups. These are the headwater areas of many large river systems with high hydroelectric power and irrigation potentials, hence their strong and direct influences on the operation and existence of the Hoa Binh and Thac Ba Hydroelectric Power Plants, as well as on agricultural production environment and human life in northern Vietnam.

In the areas of low elevation in Ha Tuyen, Hoang Lien Son, Vinh Phu and Ha Son Binh provinces, the new forests to be grown as per plan will mainly supply timber, firewood and industrial raw materials. While in the areas

of higher elevation in Lai Chau, Son La, Ha Tuyen and Hoang Lien Son Provinces, protective forests and special trees of high economic value will be planted. Local economic planners expect to expand the forest cover in the six provinces as a whole to 40-50 percent in ten years' time, involving about one million peasant households in forestry and agro-forest economic development.

In 1990 Lai Chau, Son La, and Ha Son Binh provinces alone planted 1,251 more hectares of forests, 935 hectares of which are protective forests in 43 villages lying along the Da River that supplies water for the Hoa Binh Hydropower Plant.

World Food Program Afforestation Programs Viewed

*BK1501100891 Hanoi VNA in English 0722 GMT
15 Jan 91*

[Text] Hanoi VNA January 15—Since 1978, four afforestation projects funded by the World Food Program have effectively contributed to socioeconomic development in Vietnam.

Projects No. 2780 and No. 4126, deployed in five central provinces (Nghe Tinh, Quang Binh, Quang Tri, Thua Thien-Hue and Quang Nam-Danang), have greatly

increased the rate of afforestation in all those localities and provided permanent and seasonal jobs for several thousands of local labourers.

Project No. 3352 is under way in the northern provinces of Bac Thai, Vinh Phu and Ha Son Binh and the Hanoi area. This project was started in June 1989 and will conclude on May 30, 1993, under which 70,000 hectares of concentrated forest and 11,000 hectares of scattered trees will be planted. Over the past 20 months 25,000 hectares of forest have been grown, accounting for 37.7 percent of the plan, and the planting of scattered trees have achieved 43.5 percent of the plan. The newly afforested area has been providing the local people with firewood and some other valuable forest products, as well as favourable conditions to combine agricultural production with forestry.

At present the Vietnamese Ministry of Forestry has completed the feasibility study of Project No. 4304, with a total capital investment of U.S. dollars 30 million, to plant 150,000 hectares of forest during 1991-95 in 18 districts of 17 coastal provinces from Quang Ninh to Thuan Hai. When finished the project will provide 1.5 million cubic metres of timber and firewood for the local people.

REGIONAL AFFAIRS

Tripartite Sudetenland Environmental Disaster

91EP0156A Warsaw ZYCIE WARSZAWY in Polish
22 Nov 90 p 4

[Article by Krzysztof Walczak: "Who Is To Blame for 'The Death Triangle?'"]

[Text] Several dozen of the largest smokestacks located in German and Czech industrial centers within 100 kilometers of the Polish border are the main sources of catastrophic environmental pollution in the so-called death triangle, the center of which is in Bogatynia. At the same time, an agreement on ecological cooperation signed by the prime ministers of Poland, the GDR, and Czechoslovakia has now virtually become a dead letter, given new political conditions.

Declarative provisions adopted in Wroclaw and Jelenia Gora by the then heads of government can no longer be reconciled with the radical, ecological policies announced by the governing teams of the three countries. Therefore, the Sudetenland agreement should be revised by the governments and replaced with specific obligations, especially on the part of Germany and Czechoslovakia, because the greatest stream of gases and particulate matter comes over to the Sudetenland and Lower Silesia from the west and southwest.

It appears that this time as well it should be up to our government to take an initiative regarding a new agreement on environmental protection in the border areas of the former GDR, Czechoslovakia, and Poland. We have new partners who will hopefully not avoid controversial topics which are difficult for them. A year ago, Prime Ministers Rakowski, Adamec, and Stoph tried to outdo one another in verbalism and smooth words about friendship under socialism which brought about the adoption of a document with little meaning.

All that the agreement from last year involves is a compromise provision to the effect that parties to the agreement "will use every opportunity available in order to ensure a reduction in the emission of gases, particularly sulfur dioxide and nitrogen oxides, affecting the border areas." Therefore, there are no specific obligations, no numbers or deadlines in the agreement. The authorities of Czechoslovakia and the GDR at the time, who were only induced with difficulty to sign any environmental agreement at all, persistently rejected Polish proposals to reduce the emission of sulfur dioxide by 1993 from specific sources by at least 30 percent compared to 1985 and to reduce, or at least stabilize, the emission of nitrogen oxides so that emission in 1995 will not exceed the 1987 total.

The partners of Poland, at the time, also promptly rejected negotiating a proposal to set up joint monitoring of all sources of pollutants within a radius of 150 kilometers of the junction of borders in the vicinity of

Bogatynia. The draft establishing a system for monitoring the state of the environment was rejected, and no negotiations were started concerning responsibility under international law for losses caused by one's neighbors. Guidelines for settling issues in dispute were not agreed upon, mainly due to the resistance of Czechoslovakia. The issue of damages for the contamination of the Odra with fuel oil in 1986 continues to be suspended.

Joint surveys of the purity of the Odra at the border bridge in Chalupki are among the few practical results of the trilateral agreement. The Odra also falls within the scope of interests of the FRG environmental protection authorities. At this year's September meeting of the prime ministers of Baltic countries in Ronneby, Poland, Czechoslovakia, and Germany agreed to set up the Odra Commission with the expected participation and support from the EEC and OECD.

I do not deny that the operation of the Odra Commission is essential. It is badly needed, and we should be satisfied that it has acquired a joint-European dimension. However, it should be noted that, in principle, the Odra is not a source of drinking water, whereas air polluted in excess of all norms devastates enormous areas of forests, destroys cultivated topsoil, acidifies the ground and surface waters, and affects the health of millions of people in each of the three states.

Last year's estimates (this year's are certainly higher) referred to more than 7,000 hectares of entirely destroyed forests in the Sudetenland and 100,000 hectares threatened with biological extinction. Raw-material losses are not the only issue; the deforestation of a water-bearing area of this size means dangerously upsetting the balance of water in the mountains and in the densely populated and economically used foothill areas. In every one of the Sudetenland forest inspectorates (Kamienna Gora, Szklarska Poreba, and Sniezka), more than 96 percent of the balance of tree stands which have survived so far will die, leaving on the slopes only dead stubs mixed in places with larch and a few deciduous species which are more resistant to "acid rain." The Karkonosze National Park is already losing one-half of the trees in its tree stands.

The "Death Triangle" at the confluence of the Czech, German, and Polish borders includes more than just dying forests of the Sudetenland. The Czech-German border areas could only figure in the GDR press as "a border of friendship." In reality, the greatest ballast of pollution in Europe is accumulated here. Only Upper Silesia can rival it. In May of this year, a GDR documentary on the true scope of the disaster was shown for the first time at the International Festival of Ecological Films, Eko-Film, in Ostrava. In the past, the censors and politicians of the communist republic banned its showing which could have "disrupted traditional good-neighborly relations between friends."

Likewise, just recently the Polish Ministry of Environmental Protection, National Resources, and Forestry

published a report on transborder migrations of gaseous pollutants. It suggests (data for 1988) that Poland sends 36,000 tons of sulfur dioxide to the former GDR, whereas emission in the opposite direction is more than 10 times higher—486,000 tons. The proportion for the transborder migration of nitrogen oxide is similar—almost 5,000 tons from Poland to the GDR but six times as much from the GDR to our side. The emission of sulfur dioxide from Czechoslovakia to Poland is two times higher than in the opposite direction.

The greatest sources of destructive gases in Germany are located in the vicinity of the Polish border (Jaenschwalde, Boxberg, and Schwarze Pumpe) and do not have equipment for particulate matter control and desulfurization. The average degree of particulate matter removal from combustion gases amounts to about 92 percent in Poland, whereas in the former GDR only 60 percent of particulate matter are retained and desulfurization of combustion gases virtually does not exist.

Jaenschwalde, the most modern coal-fired power station in the GDR, discharges 400,000 tons of sulfur dioxide into the air annually, or almost twice the entire nationwide emission of sulfur dioxide in Sweden. Three smokestacks in Jaenschwalde, which are 300 meters high, carry the stream of sulfur beyond the border of Germany. In Poland, the winds blow mostly from the west....

Environmental-protection experts from the former GDR and Czechoslovakia kept statistics concerning major pollutants and their effects secret. It was difficult to compare them with the results of Polish establishments due to the use of, at a minimum, strange and obsolete methods of determining the amount of discharges in the GDR and Czechoslovakia. For example, the two neighboring countries did not recognize our measurements of pollutants precipitating with snow. We have already armed ourselves with Western measurement stations, and we are planning further modern stations in the Sudetenland, Silesia, and the Moravian Gate. The goal is to collect convincing evidence of who does the poisoning and to what extent.

The State Committee for Science, Technology, and Investment in Prague did not publish a complete statistical study on environmental protection until May of this year. Josef Vavrousek, federal minister of environmental protection, admits that his country ranks second in Europe (next to the GDR) in the emission of sulfur dioxide per capita and per square kilometer. In the vicinity of the Czech [cities of] Chomutov and Most which affect the south of Poland, the annual concentration of sulfur dioxide exceeds by a factor of three the Czech norm, which is exceptionally liberal to begin with.

On the territory of the former GDR, lignite is virtually the only fuel for power stations. After the unification of Germany, politicians from the banks of the Rhine announced a gradual reduction in the mining and burning of lignite in the territory of East Germany. However, this will not happen overnight; for this reason,

the annual consumption of lignite is still estimated to be about 300 million tons. In the GDR, 50 percent, and in Czechoslovakia, 30 percent of boilers burning lignite for power are located close to the Polish border in such a manner that the by-products of combustion, particulate matter, and gases not filtered out locally are exported to our country.

Our neighbors from the south and the west are well aware of these proportions. Therefore, it is time to prepare a new trilateral agreement on the issue of protecting the atmosphere in which specific obligations will be undertaken: where, when, and by how much the stream of gases and particulate emissions will be reduced. A reference in the old document to "results achieved within the framework of the CEMA" sounds downright ridiculous.

ALBANIA

Government Creates Environmental Protection Body

LD0601102291 Tirana ATA in English 0906 GMT
6 Jan 91

[Excerpt] Tirana, January 6 (ATA)—The Presidium of the People's Assembly convened on January 5, before noon, under the presidency of its chairman Comrade Ramiz Alia.

In this meeting the Presidium examined and approved several important decrees.

Firstly, it approved the decree "On the Creation of Banks with the Participation of Foreign Capital and the Opening of Foreign Banks' Representation branches or bureaus in the PSR of Albania".

Besides, this decree will contribute to the swift circulation of currency means on the part of the bank organs as well as to the augmentation of these means.

Then the members of the Presidium of the People's Assembly approved the decree "On the Use of Fire Weapons by the Forces of the Border, Public Order and Armed Military and Civil Guards". This decree aims at disciplining the use of fire weapons by these forces.

The Presidium made also certain amendments to the decree "On the Protection of the Environment from Pollution" and decided to create the Committee for the Protection of the Environment. [passage omitted]

BULGARIA

Disposal of Kozloduy Radioactive Waste Poses Problems

AU1501171191 Sofia DEMOKRATISYA in Bulgarian
4 Jan 91 p 2

[Article by Docent Todor Dimchev: "Radioactive Waste from the Kozloduy Nuclear Power Plant"]

[Text] Whereas human artifacts may survive for thousands of years, the radioactive waste from the thermo-nuclear process in nuclear power plants "live" for millions of years. When one analyzes the state of nuclear and radiation safety at the Kozloduy Nuclear Power Plant and the guarantees for its safety, one can understand why this problem is crucial for our small country if new nuclear power plants are to be constructed. Is it possible to guarantee an acceptable solution?

The Energy Industry Committee put the No. 5 generating unit into service two years ago without the supplier (the USSR) having provided and installed the following installations specified in the project: for sealing radioactive waste in bitumen, for burning combustible radioactive waste, for compacting solid radioactive waste, and for recovering oils contaminated with radioactivity. The result of this gross infringement is evident—a radiation accident occurred! The ground to the west of special building No. 3 was contaminated with liquid radioactive waste. At the Kozloduy Nuclear Power Plant at the moment, all the tanks of the temporary containers in special buildings Nos. 1, 2, and 3 for the temporary storage of liquid radioactive waste are filled with distillation residue.

The Kozloduy Nuclear Power Plant is now about to start up the No. 6 generating unit. Once again, there are no installations for processing liquid and solid radioactive waste. The storage tank area of special building No. 3 has merely been extended, but this is only a temporary solution. It gives no guarantee preventing these tanks from being filled to capacity. This may result in a new radiation accident, because there are still no waste processing installations and, most important, because liquid radioactive waste is being produced in amounts above the quantities specified in the project.

For example, the project for the Belene Nuclear Power Plant, with four generating units fitted with VVER-1000 reactors, estimates that about 80,000 cubic meters of liquid radioactive waste will be produced annually. However, within only five months the No. 5 generating unit at Kozloduy has produced 25,844 cubic meters of liquid radioactive waste, equivalent to the quantity allowed in the project for a whole year! The persons responsible for this are the management of the nuclear power plant and the staff of the reactor department of the No. 5 unit.

The problem of the solid radioactive waste from the four generating units fitted with VVER-440 reactors has still not been solved.

The storage containers in special building No. 1 are full. The containers in building No. 2 are empty, but they are still not being used because the building contains water, which reappears after it has been pumped out. The additional storage container which has been built will soon be full. In the case of the Nos. 5 and 6 units, the project specifies the construction of a processing building and a storage reservoir for removal of the

processed radioactive waste. Installations are specified for combustion, for compacting the waste, and for recovery of the waste oil contaminated with radioactivity. However, this building is still not under construction, nor are there any processing installations. Everything still exists only on paper. The projects are not being implemented! Yet during this period a special group led by Engineer Donchev, chief director of capital construction in the Energy Industry Committee, has been traveling around the world in order "to investigate offers" by Western companies connected with equipment and technologies for processing, conserving, and storing radioactive waste. The offers carry price tags of tens of millions of dollars, which are unlikely to be made available in the near future. Despite this, the traveling continues.

Instead of making trips to the West, it would surely be much better to construct and put into operation the semi-industrial installations already developed in Bulgaria for sealing radioactive waste in bitumen, for ultraviolet treatment of the waste water from the special laundry at the nuclear power plant, and so on, as well as for the Nuclear Energy Industry Economic Trust to take measures to reduce the amounts of radioactive waste produced, as is indeed specified in the projects for the generating units.

Instead of speeding up the investigations of the technical offers already submitted by the Westinghouse, SGN [transliterated, expansion not known], Siemens, Nuchem, and Noel companies, as well as the project for technical aid and its amendments which have been proposed by the International Atomic Energy Agency, certain gentlemen from the nomenclature in the Energy Industry Committee and the Committee for Peaceful Uses of Atomic Energy are seeking "new offers" in the West.

The dear people are seeking their fortunes, so good luck to them!

Water Supply in Burgas 'Unfit for Drinking'

AU0101155991 Sofia DUMA in Bulgarian 29 Dec 90 p 1

[Tsanko Raychev report: "Water in Burgas Is Unfit for Drinking"]

[Excerpt] The drinking water in Burgas is unfit to drink. This is the conclusion of the laboratory inspection, conducted in recent weeks. [passage omitted]

Experts are unanimous in their conclusion that dozens of industrial plants and towns and villages dump their waste water straight into the rivers, in the proximity of the drinking water storage facilities. For example, the painters shop in Kotel stated that it uses five kinds of dyes and more than 20 paints, and dumps its waste in the

river without any preliminary purification. The settlements along Kamchiya River have no purifying installations. The pigsties dump their waste in the drinking water zone, as if it were a septic tank.

CZECHOSLOVAKIA

Czech Environmental Minister Interviewed

91CH0188D Prague ZEMEDLSKE NOVINY
in Czech 20 Nov 90 p 3

[Interview with Bedrich Moldan, minister for the environment of the Czech Republic, doctor of natural sciences, by mel; place and date not given: "Three Questions for the Minister"]

[Text] [mel] Does the Sokolov Basin Okres, where the environment is also one of the worst in the republic, not stand a little bit in the shadow of North Bohemia Kraj?

[Moldan] Unfortunately, yes. The only possibility is for us to approach the entire matter in a comprehensive manner in the future. This means that we should not divide the region as we have done thus far into Bohemia and the Sokolov region, but should rather talk, for example, of the Krusne Hory Mountains foothill extraction region and solve its problems all the way from As to Decin.

[mel] How does the Ministry for the Environment intend to support the output of the state administration at the present level—in other words, directly in the okreses?

[Moldan] The basic link will be okres offices. A substantial role in the struggle against the further deterioration of the environment can be played by communities and towns making use of all of their authorizations. We are also counting on the creation of approximately nine specialized detached work sites, one of which will obviously be at Chomutov and will have jurisdiction over that extraction region. These work sites should have inspectorates at their disposal—inspectorates for the atmosphere, water, forests, soil, waste materials, and nature. For the present, they should come into being independently; subsequently, we expect them to be integrated.

[mel] What is the current status of preparations of new laws having to do with the environment?

[Moldan] The Law on Protecting the Atmosphere is in the final stage of negotiation and should be presented to parliament for approval by the end of the year. The same is true of the Law on Waste Materials. The Law on the Environment must still pass through the mockup stage and will not be presented for approval until next year. Currently, we have handed the Czech National Council a proposal for a law on the protection of nature.

Need To Establish Environmental Priorities Seen

91CH0188A Prague HOSPODARSKE NOVINY
in Czech 14 Nov 90 p 10

[Article by Eng. Vladimir Goetz and Eng. Frantisek Sedivy: "Priorities Need To Be Seen"]

[Text] In recent times, it would appear as though tension between "ecologists" and "economists" is on the rise in various public polemics. One group is eager (for finances) and the other is reluctant (to provide them). The former then threatens apocalyptic visions and accuses the latter of cynicism and social blindness. Is this truly the case? Can there not be some kind of misunderstanding here? There is, and it is substantial.

It lies in the fact that, thus far, a state policy in the area of the environment, and particularly the immediate practical and subsequent goals of the policy, have seen little specific definition. These goals cannot be deduced either from the scenario of the ecological policy, which was published as part of the documents of the economic reform, nor from all of the hitherto worked-up materials regarding the status and measures involved in the environment, for example, the Blue Book and now the Rainbow Book—which appear to be mostly critical and pretentious in character: what all is bad, what all must be changed, and how much will have to be invested in rectification. The more, the better. The result is then a large package of generally defined and heterogeneous measures regarding the costs which are listed by some as amounting to Kcs 700 billion and which are frequently treated as a categorical imperative of the highest priority.

However, let us attempt to take a look at the problem of the environment in its broader connections and, at the same time, peer a little bit into the above packet.

The protection and creation of the environment is a component in the care and maintenance or creation of conditions for the good physical and mental development of the current and future population. In and of itself—without any relationship with people—it is meaningless. And so, the recognized components of the environment (air, water, the landscape, the residential and working environment, to name just the obvious ones) are joined by numerous other factors influencing the way of life. These are primarily the generally available level of health care, foodstuffs and eating habits, potable water as a foodstuff, care for the physical and mental development of the population, including the minimizing of stress factors, the influencing of the esthetic environment. However, the influencing of these factors is completely fragmented at the center.

In each of the above areas (and it would be possible to add others), numerous negative factors have accumulated from the past which vary in the severity of their influence. Their intensity can be expressed on a

declining scale from maximum to minimum somewhat as follows:

- direct threat to a life which is otherwise capable of an honorable existence;
- causing serious illnesses or the shortening of life;
- demonstrably causing health problems in a broader manner;
- unfavorably influencing a feeling of well-being or civic self-confidence.

This sequence should also be reflected in the time sequence for the elimination of these factors, particularly in the initial stages which are necessarily aimed at the most serious ones. However, the viewpoint of the seriousness of the negative influences has thus far not been applied as a priority in our country. In decisionmaking, the industrial approach continues to be maintained and is, moreover, broken down into individual substantive segments. It is only with difficulty that the causes can be traced: It will most likely be a relic of the past, based on the former bureaucratic centralist management which loved clear borders running from the top to the bottom and which had their beginning in the very center itself. However, it can also be that, for the time being, responsible officials do not consider it to be necessary.

And so we live at a time when, on the one hand, lives are directly threatened or people are actually dying from the lack of medicines or because of the low number of functioning artificial kidneys and, on the other hand, billions in funds are being allocated for the ostentatious purification of wastewater (for example, from Plzen or from Prague) with parameters which were profligate already prior to 17 November, not to mention today. However, efforts to economize in this and in other cases are unusually troublesome because no one actually is accountable for these funds—it is more likely that a “go-ahead-and-build” attitude will be favorably regarded. Numerous examples can be used to document the fact that not everything which is presented as being ecological is, in fact, of immediately ecological necessity and, thus, even less so from the economic standpoint. A substantial portion of the above Kcs 700 billion of internal ecological debt falls into this grouping. These funds could or should be used with priority in benefiting the health industry and youth care, where their contribution would be greater in terms of orders of magnitude.

Whether we like it or not, the fact that poor people must conduct themselves differently from the rich is objectively valid. The dividing line lies neither in politics nor in ideology. We have no choice but to fall in line. Undoubtedly, in comparison with rich countries, which have been concerned about their environment for years, we are poor. But not so poor that we cannot rapidly and effectively solve our most pressing problems in caring for the living conditions of the population, without regard as to which ministry is responsible for the solution. This is where we should now concentrate our attention with priority and let no one get away with anything.

On the other hand, however, we should keep a cool head in all international negotiations regarding ecological problems and, for the time being—as long as we are poor—should use our money, in a priority manner, to solve only that which already now gives us a bad headache and not that for which we may earn words of praise, but which has no immediate significance for us. Most importantly, perhaps, the circle of people who can thus acquire foreign experiences on the one hand is growing; on the other hand, however, this does not contribute to the penetration of foreign firms into activities which we are very well able to perform for ourselves.

To the extent to which we act this way and register for all international activities fully and in good faith, this cannot be evaluated in any other way than as a manifestation of the continuing ideologization of the economy which, over the past 40 years, let down deep roots in our country. At first, proletarian and socialist internationalism with roots for the domestic maintenance of social securities was placed above all. Now, it seems, that we are repeating everything in green.

The latest example of this ideologized approach is our signature on the Labe River project which, according to press reports, is intended to improve the quality of water in the Labe River to a level where it could be modified into potable water without difficulty. This is undoubtedly a correct idea, yet it is in no way urgent for us and if it is to be realized it will mean only the excessive diversion of financial resources which are in short supply anyway. The existing concept for supplying potable water for the decisive Labe River watershed in our territory did not figure, and does not figure for the future, on the fact that raw water for modification into potable water will be drawn from the Labe River. Surface-water takeoffs are, for the most part, situated in the upper reaches of waterways where the quality situation is favorable, where any possible measures are inexpensive and do not require those billions of korunas which are being contemplated for the above-mentioned project in the Czech portion of the Labe River watershed (according to available documentation, this amounts to 140-150 billion korunas).

It is possible that the difference between our essential need to improve the quality of water in the Labe River watershed in the nearest future and the demands by the Federal Republic of Germany to improve the quality of water in the Hrensko profile, where the Labe River leaves our territory, will be covered by resources from the Federal Republic of Germany or by other countries. Naturally, there can be no objection to this. However, if this were not the case and if we are to cover the costs fully from our own resources, this is not comparable to that “painting of the hand rail,” of which Minister Klaus spoke and which evoked displeasure among many people. It is equivalent to bleeding a virtually foundering horse in the belief that this is the only way it can continue to serve its rider.

We should all be aware that after the concentrated elimination of the most egregious and clearly health-threatening shortcomings we should open up the breadth of solved ecological problems in dependence upon the

growing possibilities inherent in our economy in such a way that, in the final analysis, we could even solve those which have a long-term and intermediate-term effect. It is substantially of no consequence whether we shall burden the enterprise sphere or the state budget with these costs, since in both cases we shall slow down the recovery of the economy. If we were to act differently—and this is true not only of the environment—then we would be likening ourselves to our artistically creative ancestors—our pigheaded and defiant forebears. Or perhaps we would be more like Mr. Martin Zemla, trying to keep the wolf from the door.

Placing Value on Environment Discussed

91CH0188B Prague HOSPODARSKE NOVINY
in Czech 14 Nov 90 p 10

[Article by ju: "Is It Possible To Place a Value on the Environment?"]

[Text] Despite the fact that problems of the environment have for years been at the center of attention in industrially advanced nations, environmental protection must, for the most part, continue to compete heavily with other "more traditional" economic policy goals in the distribution of state financial resources. One of the reasons for this situation is the fact that financial revenues from ecological investments generally lack clear monetary valuations, since they do not pass through the marketplace. Economists in a number of countries in recent years have dealt with the question as to how it would be possible to at least approximately value these benefits financially—and together with them, quantify the losses resulting from the degradation of the environment. The reason for this is not only to permit the environment to adopt a firmer position in public decisionmaking regarding priorities of socioeconomic development, but also the fact that this valuation also brings with it a better understanding of the ties between the economy and the environment.

Contributions based on the protection and development of the natural environment very often appear to be—particularly insofar as they are not immediately reflected in the reproduction of material goods—intangible and difficult to comprehend. Similarly, damage to the natural environment as a result of the most varied forms of economic development (even if, as a rule, it is possible to express it physically, for example, in the guise of losses of plant and animal varieties, degradation of the soil, contamination of the water, etc.), for the most part, cannot be directly interpreted in economic terms. Efforts to ascribe monetary values to the environment or its individual components are undoubtedly a problem and the subject of controversy and not even proponents of these efforts believe that all pluses and minuses in the area of the environment can be expressed in financial terms, nor is this necessarily suitable. The expression of benefits derived from investments in the environment in monetary units, that is to say, their transposition to a common denominator with the benefits flowing from the

majority of other types of investments, however, conceals a number of advantages.

Monetary expression makes it possible primarily to make a direct comparison between expenditures and their benefits and to judge whether society is acquiring adequate countervalue for the resources it thus expends. A financial valuation of the benefits resulting from investments in the environment is used in some countries, for example, in proposing and introducing state ecological regulation, and frequently serves as an argument for stricter regulation: The monetary estimates of benefits resulting from the removal of lead from gasoline, for example, contributed in the United States to the introduction of unleaded gasoline. However, attempts to place a financial value on the environment frequently also serve as an illustration of the extent to which the environment is subjectively important to the public and the extent to which this importance changes over time. Some case studies in which Western countries attached valuations to benefits resulting from improving the environment showed significant and sometimes surprisingly high valuations in this regard.

The techniques of monetary valuation as applicable to the environment or to the benefits resulting from investments in its preservation, which were verified in recent years in a number of Western countries, are generally quite complicated in their details; however, their basic ideas are very simple. Basically, there are two principal methods for this valuation. The first of them is based on efforts to find "replacement" markets which would capture the cost of ecological properties, the second method is connected with stimulating market valuation.

Even though the values of the environment, for the most part, cannot be directly valued by the market, there are commodities which are traded in the market and which include ecological values. Thus, for example, the prices of houses located near airports are lower, under otherwise equal circumstances, than the prices of houses in quiet regions. The value of "peace and quiet" can be found through statistical identification of the individual magnitudes contributing to the prices of houses. Similarly, it is possible to attach a value to the quality of the atmosphere, which is also one of the factors influencing the prices of real estate in advanced countries. The results of analyses conducted in large cities in the United States indicate that 1 percent of increased contamination of the atmosphere leads to a decline in the prices of homes by about .1 of a percent and, on the other hand, prices grow by this amount if there is a 1-percent improvement in the contamination. The significance of this valuation is clear: For example, measures designed to reduce contamination of the atmosphere by 10 percent lead to increases corresponding to 1 percent of the overall value of homes impacted by air contamination.

A number of studies in Western countries have also been aimed at determining the relationship between real estate prices and the exposure of real estate to traffic noise. The results of analyses conducted in various

countries agree on the fact that a decline in the price of houses under the influence of these factors represents 0.4 to 0.5 percent per decibel. According to French estimates, the overall deterioration of the domestic house inventory as a result of traffic noise amounts to virtually 1 billion francs per year. However, it is also possible to list different examples. A considerable part of ecological policy in Western countries deals with attaching values to health risks connected with toxic materials, radiation, air contamination, etc. Some jobs are more at risk in this regard than others. An analysis of the factors contributing to higher wages in these professions makes it possible to estimate the financial "value" of this risk.

An alternative approach to valuation of the "price" of the environment is still far simpler: It is based on the direct determination of the value which people attach to the environment. For the most part, it is based on the questionnaire technique which finds out how much people are prepared for preserving or developing the environment. In recent years, this approach was utilized in the FRG where randomly selected population groups were used to determine the "price" of a clean atmosphere. An analysis of the opinion of the public indicated that it would be "worthwhile" to spend up to 75 billion marks to assure a clean atmosphere on the territory of the FRG. The value ascribed to the quality of the atmosphere was higher in the case of people who were better informed regarding the status of contamination and its effects on health, material property, and vegetation.

The financial valuation of the environment has, understandably, a number of limitations. If, however, it contributes to determining the willingness of the public to pay for certain health improvements, it is possible to also determine the optimum size of the investments which could be made in improving the environment which would reflect the social preferences in a given region. However, attaching a value to the benefits brought about by the environment results in more than a monetary expression of the value of its quality. The acquisition of "corresponding" monetary values is even sometimes considered to be a less important goal of this analysis. The detailed approach to the measurement of benefits derived from the environment as well as losses due to its deterioration does facilitate an understanding of the relationship between the economy and the environment: It shows that clean air and water, preservation of species, and limitation of wastes can be as equally important to economic development as the more "conventional" social properties such as health and education.

Hundred-Fold Standard Radium 226 Concentration Claimed

91C70210C Prague ZEMEDEL'SKE NOVINY
in: *Pravda*, 9 Nov 90 p 3

[Article by Jaroslav Vanecek: "The Specter Called MAPE Gate—The Concentration of Radium 226 Has Been Exceeded More Than 100-Fold"]

[Text] It is not only in the vicinity of Mydlovary that the public pronounces the name of the chemical dressing plant for the radium industry—the MAPE Mydlovary Plant—with ever greater fears. The agitation surrounding this enterprise arose on the basis of the bombastic proclamation of the Austrian branch of Greenpeace as early as the second half of January of this year when the organization claimed that a nuclear disaster had occurred at this plant in the past.

Even though this claim was contradicted by logical facts, doubt was sown not only among the population, but even among the organs of state administration. On the basis of this doubt, therefore, there was an agreement between the Kraj National Committee for South Bohemia Kraj and the Institute for Kraj Ecology of the Czechoslovak Academy of Sciences at Ceske Budejovice regarding joint measurements which were to be accomplished with the participation of the kraj hygienic station and which were to confirm or deny the necessity for continuing a more detailed monitoring of the influence of the MAPE plant on its environs. For purposes of sampling the soil, sediments, and water from the plant water outlet, for purposes of measuring radiation dosages in the surrounding area on agricultural land and in samples of agricultural products, the local national committee and the Institute for Kraj Ecology concluded a contract and allocated approximately 100,000 korunas. And this occurred despite the fact that employees of the section for the hygiene of radiation of the kraj hygienic station had cast doubt on the need to carry out further monitoring and measuring of radioactive substances in this area in June and July. At the same time, the principal hygienist for the Czech Republic, Dr. Tichacek spoke about the unneeded consumption of social resources because the study by the Institute for Kraj Ecology allegedly cannot result in anything new since the hygienic service is monitoring everything.

On Thursday, 8 November, the CTK News Agency reported from Vienna that an employee of the Austrian Institute for Ecology, nuclear physicist Peter Bossew, had found a dumping site in the vicinity of the MAPE plant at which radiation levels of radium 226 were measured in concentrations of 800,000 becquerels per kilogram of mass—the natural concentration is 40 to 60 becquerels per kilogram of mass. The physicist warns of a time bomb which threatens to explode in view of the long half-life of the elements, which runs for thousands of years into the future. The following day, the director of MAPE Mydlovary, Eng. Stefan Lasica, reacted in responding for our newspaper by saying that this is technical nonsense because these values had never occurred in the plant's production. Last week on Wednesday, however, the chief of the Department of Radiation Hygiene at the kraj hygienic station in Ceske Budejovice, Eng. Jan Matzner, confirmed that, together with the Institute of Work Hygiene of the Uranium Industry at Kamenne, they had found radium 226 with a mass activity of 535,000 becquerels per kilogram of mass at a dump site within the hygienic protection belt of the

enterprise. Eng Lasica immediately proclaimed that "the illegal dump is quite old and it is clear that it originated with the MAPE plant. The culprit has violated the regime of managing waste materials. During an investigation, we requested cooperation from organs of the okres administration of the SNB [National Security Corps] in Ceske Budejovice." Let us add that the incriminating waste material at the dump site most likely stems from the mill through which the ore passes.

Late afternoon on Friday, the Institute for Kraj Ecology of the Czechoslovak Academy of Sciences was presenting the results of its study at the Kraj National Committee for South Bohemia Kraj. Among others, the study states that the measurable concentration of radium 226 in the samples taken beyond the borders of the enterprise exceed the average ground value more than 100-fold (!). The study also stresses the real danger of having the radionuclides enter the food chain. It also speaks of the fact that the concentration of radium 226 in the upper layers of the sediment of the Bezdrev pond corresponds to the values in the retention basins at MAPE, which serve to capture and store contaminated sediment. According to measurements of the external component of gamma radiation in the environment, it was clearly confirmed that the source of the supplemental contamination is the MAPE plant. The increased value of gamma radiation in locations accessible to the public exceeds the current background radiation 11-fold to 23-fold. It was also demonstrated that the MAPE plant even releases radioactive wastewater into the waterway, although the plant claims that this is a closed production cycle. The conclusions of the presented report then recommend that detailed research be continued.

In response to the question we put to Eng. K. Mondspiegel, the coordinator of the research team from the Institute for Kraj Ecology, as to whether the surrounding population is facing immediate danger, we received the answer that it was not possible to clearly confirm or deny any influence on the status of health of the population in the vicinity. For example, despite varying measured values it has, for the time being, not been possible to demonstrate any contamination of sample vegetables in the community of Mydlovary. Of course, he does not recommend living in the close proximity of the dump site which should be decontaminated in the immediate future. The borders of the hygienic protection belt will be clearly marked.

The study by the Institute for Kraj Ecology of the Czechoslovak Academy of Sciences was presented to yesterday's meeting of the Council of the Kraj National Committee for South Bohemia Kraj. It was recommended that, in view of the termination of the activities of this organ of the Okres National Committee in Ceske Budejovice, that the study be passed on for an expression of opinion by the Ministry for the Environment, by the kraj hygienic station, by the Institute of Hygiene and Epidemiology, and by the Institute for the Hygiene of Work at Kamenne.

Potassium Iodide Pills To Be Distributed Against Radiation

AU0701150591 Prague CTK in English 1942 GMT
4 Jan 91

[Text] Prague Jan 4 (CTK)—Potassium iodide tablets, imported from Yugoslavia in 1988, will be distributed to the Czechoslovak population this year as prevention in protecting the thyroid gland in case of a radiation accident, Chief Czech and Slovak Hygienists told CTK today.

The two specialists, Dr. Margareta Sulcova of Slovakia and Dr. Jaroslav Kriz from the Czech Republic, said that potassium iodide pills were to have been given to the population of areas close to nuclear power plants in 1988, but the scheme was dropped on an order by the Czechoslovak Communist Party Central Committee.

At present the pills are available free of charge in pharmacies within the range of 30 km from the Jaslovské Bohunice Nuclear Power Plant in West Slovakia.

Jaslovské Bohunice Nuclear Plant Safety To Be Enhanced

LD0701211791 Prague CTK in English 2024 GMT
7 Jan 91

[Text] Prague Jan 7 (CTK)—Innovation and reconstruction at the V-1 nuclear power plant at Jaslovské Bohunice, West Slovakia, will ensure further raising the plant's safety and operational reliability, experts from the Czechoslovak Economics Ministry say in a statement conveyed to CTK today.

The statement was issued in connection with the campaign waged in neighbouring Austria against nuclear power generation in Czechoslovakia.

The statement says that several renowned organizations, i.e. Siemens from the FRG, Westinghouse from the U.S., and an asset working team from the International Atomic Energy Agency (IAEA), have inspected the plant. A statement was made also by the world organization of nuclear plant operators, WANO. None of them drew the conclusion that the V-1 must be closed down. Only Austrian experts called for the immediate shut-down of the plant.

The Czechoslovak Economics Ministry's statement says this is nothing surprising. It is in full harmony with the official Austrian antinuclear policy which is built on the results of a referendum of 1978 which marred by a small margin putting into service of the nuclear power plant at Zwentendorf.

The relevant Czechoslovak bodies are aware of their responsibility for the safety of V-1 operation in relation to the populations of both Czechoslovakia and of neighboring countries, the statement says.

The Austrian campaign against Jaslovské Bohunice has been under way since last autumn. The V-1 is one of the oldest Soviet-type plants in Czechoslovakia, a country which wants to continue using nuclear power for ecological reasons. Its thermal power plants, burning low-quality brown coal, cause heavy damage to the environment. However, future nuclear power plants are to use Western technologies.

BRAZIL**Environment Secretary Lutzenberger Discusses Amazon With EC Group**

91SM0136E Rio de Janeiro O GLOBO in Portuguese
5 Dec 90 p 17

[Text] Brasilia—Secretary of the Environment Jose Lutzenberger said yesterday, during a meeting with a delegation from the European Communities (EC), that some of the responsibility for the devastation of the Amazon region rests with the European countries. The committee, composed of 14 delegates from the EC and headed by Pierre Defraigne, came to Brazil to evaluate the environmental issues in the Amazon region and discuss the general outlines of a proposal to use funds from the Group of Seven—United States, Canada, Great Britain, France, Germany, Italy, and Japan—to preserve the rainforest.

Lutzenberger emphasized that Europe was the source of the development model—which he termed absurd and suicidal—that is contributing to the destruction of the Amazon rainforest. At the end of the secretary's speech, Defraigne said that after spending a day hearing the views of Brazilian officials in the field and listening to the ideas of nongovernmental organizations, the delegation has realized that the proposed task is more important than had been thought. According to Defraigne, all this has contributed to the evolution of a new way of thinking about Amazonia.

Lutzenberger was harsh in his criticism of the European nations. Without mincing words, he said that Europe unleashed the devastation of the native forests in Brazil when it implemented its policy of feeding its cattle with imported grain. That, he said, destroyed the last subtropical forests in Brazil (in the south of the country), which were cleared in order to grow soybeans.

"We have destroyed our forests in order to feed fat European cows and not to feed the starving people in Brazil, whose numbers are not insignificant. This absurd policy over there has neglected the people over here—warned the secretary, making it clear that he does not share the idea of developing the Amazon and questioning whether a country with 8.5 million sq km needs to exploit its last tropical rainforest.

The meeting lasted all day, with explanations about the situation in the region and the experiments that have been conducted. Lutzenberger appealed to the EC delegation to pay special attention to the need to establish the boundaries of the "extractive agriculture" reserves, not just to protect them.

Ten Tons of Toxic Waste Unearthed in Apucarana

PY0701204091 Rio de Janeiro Rede Globo Television
in Portuguese 1500 GMT 7 Jan 91

[Excerpt] There is a risk hanging over the people of Apucarana, Parana State. The town's prefecture is

having trouble removing 10 tons of a highly toxic poison, BHC [benzene hexachloride], which was buried almost 30 years ago and has mixed with the soil.

The poison was discovered by chance when machines from the prefecture were clearing an area where the town party was to be held. Almost 10,000 kilos of BHC, a highly toxic poison, were buried almost 30 years ago. The technicians believe that even the district's water table could be contaminated. [passage omitted]

COSTA RICA**Total Deforestation by Year 2005 Forecast**

91WN0126A San Jose LA NACION in Spanish
23 Sep 90 p 8

[Article by LA NACION staff writer Marvin Barquero S.]

[Text] A study prepared by the World Resources Institute (WRI) has revealed that Costa Rica shows a forest destruction rate of 6.9 percent annually, thereby ranking first in Latin America for deforestation.

The report released worldwide by the AFP news agency states that, at this rate, our country will destroy its woodlands within a period of 15 years.

The study, conducted jointly by the WRI and two specialized agencies of the United Nations Organization (UNO), claims that this situation is exacerbated by the fact that the Latin American continent is the leading destroyer of natural forests on the planet.

The report, entitled "World Resources, 1990-1991," disclosed that the tree felling rate in Latin America is 1.3 percent annually; whereas in Asia the rate amounts to 0.9 percent, and in Africa, 0.6 percent.

An additional report prepared by engineer Jorge Rodriguez Quiros, who made several analyses to finance reforestation projects on the Isthmus with backing from the Government of Finland and the Agency for International Development (AID), charges that 400,000 hectares of woodlands are being destroyed annually.

For this reason, at a meeting to be held from 27 to 29 September in Managua, Nicaragua, officials from the Isthmus will debate the possible creation of the Forest Action Plan for Central America, aimed at dealing with the tree felling problem.

Although they accept the veracity of the studies on the likely destruction of our woodland area within a 15-year interval, officials from the Forest General Directorate (DGF) maintained that several plans have been put into effect that would prevent a disaster of such magnitude.

The most recent map of the country's forest-covered area dates back to 1987, when aerial photographs and other procedures were used to determine the status of our woodlands. With those data, extrapolations were made,

showing that, in 1943, the country had 3.825 million hectares of forests; in 1961, 2.9 million hectares; in 1977, 1,959,566 hectares; and in 1987, 1,475,940 hectares.

Based on that research, the tree felling rate between 1943 and 1987 remained at an annual average of 50,000 hectares, as Damaris Garita, from the DGF Technical Services Department, declared.

The DFG official noted that, during February of this year, aerial photographs were taken again in order to demarcate our wooded area; however, the data are still being analyzed to obtain the final report.

Uncontrollable

Some of the causes of the irrational tree felling are uncontrollable, according to the DFG representatives. Nevertheless, it is currently impossible to accurately measure the rate of deforestation in the country.

Mr. Leonel Aguilar Fong, chief of the DGF Forest Management and Utilization Department, said that one of the major problems is the depletion of the agricultural frontier, because a large number of settlers are showing up in deep virgin forest areas.

He claimed that the deforestation caused by the new settlers in order to prepare land for agricultural purposes is illegal. However, it is generally done in impenetrable areas where no one reports them; and DGF officials cannot enter to conduct inspections owing to the difficult access.

Apart from this problem which is perhaps the main one, Mr. Aguilar admitted that illegal felling is also occurring, along with the extraction of trees, in private wooded areas where such activities have become uncontrollable because of their remote location.

In some instances, especially in the case of the settlers, trees are felled for no commercial purpose; making vigilance more difficult.

Although it has officials in eight regional offices, the DGF considers its capacity to oversee and prevent the destruction of woodlands insufficient. Therefore, amendments have been proposed for the Forest Law (being negotiated in the Legislative Assembly), to enable community groups, as well as the municipalities, to establish legal controls over tree felling.

Nevertheless, as Mr. Aguilar warned, the only solution is for all citizens to become guardians, so that most of the national territory can have forest cover.

Seeking Solutions

The current plan being developed by the country to deal with the crisis of forest destruction, without neglecting the lumber supply, consists of two phases: The first is called "controlled woods" and the second, reforestation.

Mr. Aguilar explained that with the "controlled woods" plan, rational lumber operations are carried out. Businessmen engaged in this work are responsible for extracting from virgin forests only trees which can be used for lumber, leaving the younger woodlands to regenerate.

With this system, for which the DGF grants permits, and with the exploitation of trees, also authorized, whereby the use of the soil (for cattle ranches, coffee plantations, cacao plantations, and other purposes) has already changed, approximately 450,000 cubic meters of wood are procured legally each year in Costa Rica.

The regeneration of forests is slow, however, especially now that business owners are rationally exploiting trees usable for lumber, but then leaving the wooded area to recover by itself.

The government is seeking a means of providing an incentive to those engaged in this type of lumber extraction, so as later to finance a phase devoted to forest regeneration.

Mr. Alexis Mendez Quiros, chief of the responsible DGF department, reported that reforestation began to receive an impetus in the country during 1979. That year, economic incentives were created to foster this practice.

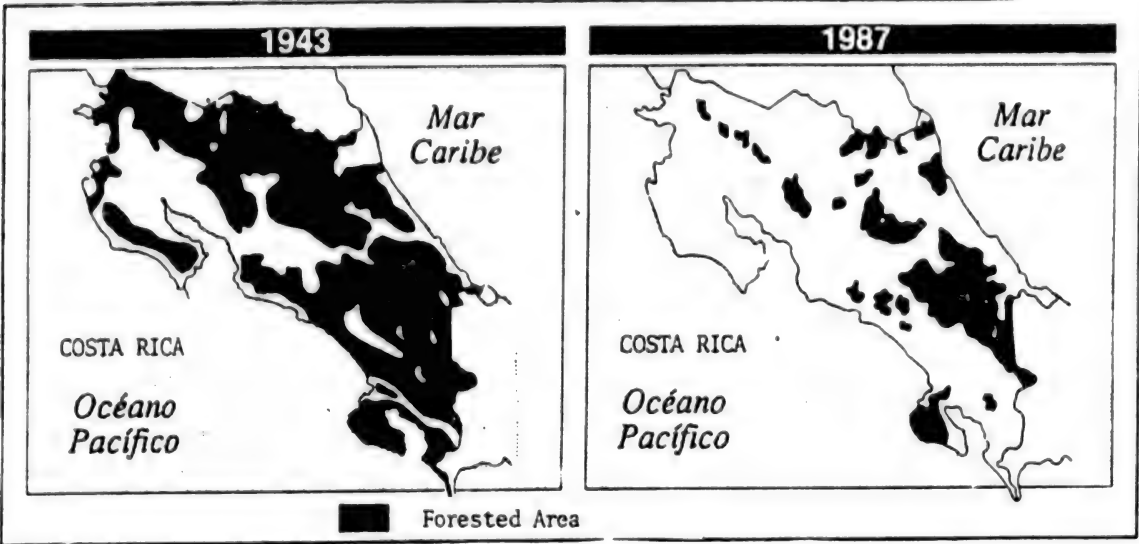
First, a deduction of 16,000 colones was granted from the income tax for each hectare reforested. This amount was later raised to 50,000 colones per hectare; and in 1988 it was replaced by the Forest Credit Certificate (CAF), which now has a value of 90,000 colones per hectare and is negotiable for various purposes. In 1991 the CAF will total 100,000 colones per hectare.

Mr. Mendez commented that, despite those incentives, starting forest regeneration has proven difficult. In 1979 only 200 hectares were reforested and, although the number increased to 8,000 hectares in 1990, the country needs 15,000 hectares reforested annually.

It is estimated that, with the latter volume, it would be possible to meet the national demand for lumber when the trees are of mature age without requiring wild forest exploitation. Mr. Mendez noted that the planting of exotic species (brought from abroad) has been encouraged, because of their rapid growth and because scientific evaluations of their development have been made in other countries. Nevertheless, the exploitation of these trees is achieved at an average age of 20 years.

Hence, at a date close to the year 2000 we shall be able to exploit large areas of forests for lumber use, planted by reforestation. This waiting period could be advanced if the development capacity under experimentation with the species called Melina is proven. It can produce good quality lumber in about four years.

However, the results of these efforts are not yet concrete. What is, unfortunately, a fait accompli is the rate of destruction of the natural forests.



Coal Mining Opposed on Ecological Grounds
91WN0126B San Jose LA REPUBLICA in Spanish
1 Oct 90 p 6

[Text] The Costa Rican Association for the Conservation of Nature (ASCONA) is opposed to coal mining in Costa Rica because, it claims, this is one of the most polluting industries in the world: a feature that becomes exacerbated when strict precautionary measures are not adopted.

The conservationists also claim that the coal existing in the national soil, especially in the Zent and Watsi mines, is of the third category, subbituminous and polluting, because it contains sulfur. This causes its mining to be socially and ecologically inadvisable, also casting doubt on its economic profitability.

ASCONA's executive director, engineer Leon Gonzalez, made these statements in response to estimates from the Costa Rican Oil Refinery (RECOPE), which is promoting coal mining activity with the intention of converting coal into a substitute for bunker fuel.

According to RECOPE, the country's coal producing potential could supply the cement industry, as well as other small factories currently operating with bunker fuel.

In response, engineer Gonzalez considered this insignificant, because "all refineries have bunker surpluses in their production, since it is a by-product and finding a market for it is difficult. So, why save it?" he inquired.

Gonzalez claimed that, on the contrary, the losses that coal mining could leave for the region's ecology are greater. He asserted that, because the areas in which the leading mines, Watsi and Zent, are located have heavy rainfall, the implementation of environmental control measures becomes difficult.

According to the conservationists, the environmental impact would occur both from the mining and the use of coal.

In coal mining countries they operate in dry areas with an annual precipitation of under 1,500 mm of water; whereas at Zent the precipitation is from 4,000 to 5,000 mm per year. This causes serious erosion problems.

They added to this the fact that the national coal contains sulfur, which acidifies the water and reduces the pH to levels intolerable for fish and animals consuming it.

Engineer Edwin Alpizar, also from ASCONA, remarked that the water from the mine flows into a nearby ravine overlooking the Chirripo River; and the latter, in turn, faces the Atlantic Ocean. This creates pollution throughout its entire course.

According to conservationists, the environmental impact study made by RECOPE has serious shortcomings; hence it is unsuitable for predicting the environmental implications of coal mining.

The other environmental impact they cite results from the use of the mineral, which would fill the air with sulfur, particularly in areas where factories using it are located.

ASCONA also thinks that, so long as the country lacks suitable legislation and strict compliance, coal mining should not be allowed.

For this reason, they urged amendments to the Hydrocarbons and Coal Bill currently being studied in the Legislative Assembly. They propose that a guarantee for compliance with the environmental protection laws be charged, equivalent to five percent of the value of the investment, ensuring that the laws on national parks and reservations be upheld and that environmental studies be made known to the public.

Concurrently, ASCONA offers as a feasible alternative to coal the production of firewood (charcoal), which would also come to represent a development in the reforestation programs.

URUGUAY

Environmental Cooperation Agreement Signed With EEC

*PY1501181491 Montevideo EL DIA in Spanish
26 Dec 90 p 4*

[Summary] The EEC and Uruguay signed an agreement for environmental cooperation. Raul Lago, Uruguayan minister of housing, land improvement, and environment, and Catherine Guibourg, EEC representative for environmental affairs, signed the agreement creating a National Center for Environmental Information and for Handling and Disposing of Toxic and Dangerous Waste [Centro Nacional de Informacion Ambiental y de Tratamiento y Disposicion Final de Residuos Toxicos o Peligrosos].

REGIONAL AFFAIRS

Soviet Environment Chief on Iraqi 'Ecological Crimes'

91P50082A Moscow LITERATURNAYA GAZETA
in Russian No 4, 30 Jan 91 p 4

[Editorial commentary by Nikolay Vorontsov, chairman of the USSR State Committee for Environmental Protection, under the rubric: "Point of View:" "Nature Is Defenseless Against People, and It Is Doubly Defenseless Against Evil People"]

[Text] The catastrophic spilling of oil into the Persian Gulf is obviously the greatest ecological catastrophe on the seas of the 20th century. There is still an inadequate amount of data, but it may be presupposed that the scale of damage cannot be compared even to the well-known ecological tragedy caused by the 1989 Exxon Valdez accident off the shores of Alaska.

This deliberate spilling of oil will do more than produce huge damage to all ecosystems of the Persian Gulf. It will lead to a temporary shutdown of water intakes for the desalination plants of the United Arab Emirates. It will lead to the death of plankton and benthos (bottom-dwelling sea organisms), to the death of fish in the Gulf itself. It will be a major blow to the economies of not only the warring nations, but Iran as well.

It must not be forgotten that the Persian Gulf is a part of the Indian Ocean. A number of fish species migrate in and out of the Persian Gulf. Shoals of fish which happen to be there at the time of the catastrophe will suffer an irreparable loss. Populations of migrating fish which inhabit the Persian Gulf, as well as the Tigris, the Euphrates, and the Shatt al-Arab [El-Al-Sharab], will also suffer huge damage.

However, the ecological consequences of this barbaric act will be felt beyond the nations of the Persian Gulf zone. It is now winter, and in the Persian Gulf area, in its shallows, a multitude of those bird species which nest in the summer in the Soviet Union, Iran, and Turkey, are spending the winter. This is also the winter home of such species from the USSR Red Book [the USSR list of endangered species] as the white pelican, the Dalmatin pelican, the utka-savka [probably a species of duck], the Indian gallinule, and many others.

The waterfowl species now wintering on the shores of the Persian Gulf nest in the USSR on the Turgay, in the Volga Delta, on the shores of the Kura and the Araks, and on the Turkmen shores of the Caspian. Some of them nest in the summer on the shores of Lake Van in Turkey and Lake Urmia in Iran.

Thus, the ecological crimes committed by Saddam Husayn affect not only the warring countries, but also the interests of other countries, particularly Iran, Turkey, and our country.

In wartime conditions we cannot count on there being action taken to collect the spilled oil. The consequences of this disaster will turn out to be the biggest ecological catastrophe on the seas.

I spoke by phone with Academician M.Ye., our great oceanologist, and a participant and leader of numerous expeditions to the Indian Ocean. He said: "The actions taken by Saddam Husayn do not constitute an ecological catastrophe. They constitute the first ecological war in the history of mankind, deliberate acts aimed at destroying the ecology of large areas. The spilling of oil in such quantities will affect all ecosystems, particularly coastal fauna, fish and their breeding and feeding areas, for many years to come. Indeed, the Gulf's coastal waters, which support fishermen of many nations, are the sea's richest region."

Scientists and environmental protection activists of various republics of the Soviet Union, especially Azerbaijan, Turkmenia, Russia, and Kazakhstan, have been exerting enormous efforts directed toward the protection, preservation and restoration of numerous rare and disappearing bird species which also winter in the Persian Gulf region. The preservation of migrating animal species can be ensured only through corresponding international agreements and conventions. A special international convention on the protection of wetlands and their fauna was signed in 1971 in the Iranian city of Ramsar. Criminal acts have [now] canceled out the efforts of large groups of environmental protection specialists and activists from many countries to preserve the bird species which migrate along the Caspian Sea-Persian Gulf flyways.

The regime which has not halted its aggression against an independent state, the regime which did not consider the opinion of the United Nations, the regime which has exposed its own people to bombs and rockets, has not refrained from ecological war. For this there can be no justification.

Nature is defenseless.

USSR Offers Help in Gulf Oil Slick Clean-Up 'Should the War End'

LD3001171291 Moscow TASS in English 1703 GMT
30 Jan 91

[By TASS correspondent Sergei Postanogov]

[Text] Moscow January 30 TASS—"The oil slick in the Gulf is the worst environmental disaster at sea in human history," Chairman of the Soviet Environmental Protection Committee Nikolay Vorontsov told a press conference in Moscow today.

The slick is now about 1.5 millimeters thick, Yuri Saturov, deputy chairman of the Soviet Hydrometeorological Committee said.

"In the past four days a total of 1,200,000 tonnes of oil have been dumped into the Gulf," he said.

By January 31, the slick is expected to cover an area 90-100 kilometers long and 20-30 kilometers wide, he said.

Oil will pollute more than 3,000 square kilometers, destroying most of phyto and zoo plankton, birds and fish.

The best way to remove the slick is to collect oil from the sea surface, Soviet expert Valentin Ziberov said. However, the Gulf war impedes the clean-up, he said.

"The size of the slick is unprecedented," Ziberov said.

He cited a recent disaster in Odessa where 60 tonnes of oil spilled into the water, inflicting damage worth two million U.S. dollars.

"The size of the oil slick in the Gulf shows that the damage from it will be billions of dollars," he said.

Academician Georgiy Zavarzin said it will take years to clean up the area using biological methods.

"Birds will be severely hit, as well as fish stocks," Vorontsov said.

In January, large numbers of birds from various parts of the world gather in the Gulf. Several rare birds from the Soviet Red Book, winter in the Gulf. Their numbers will dwindle, he said.

"Soot and hydrocarbons from burned oil are carcinogenic and the number of malignancies in the Gulf countries is likely to rise," Vorontsov said.

Participants in the press conference expressed alarm at the possibility of the use of unconventional weapons in the Gulf, saying this will threaten other parts of the world.

"The Soviet Union is in a high state of readiness to combat the catastrophe," Vorontsov told reporters. The Soviet Union has experience, hardware and specialists.

"Should the war end, the Soviet Union could take part in the multinational clean up," he said.

Soviet Environmentalist Cited on Gulf Oil Pollution

*PM0102125591 Moscow IZVESTIYA in Russian
1 Feb 91 Union Edition p 6*

[Report by G. Charodeyev: "Ecological Bomb Aimed at the Future"]

[Excerpt] According to the statement issued by Lieutenant General T. Kelly, deputy chief of intelligence of the U.S. Joint Chiefs of Staff, as a result of the recent U.S. missile and bomb strike against the Kuwaiti pipeline from which Iraq was discharging oil into the Persian Gulf, the flow of oil has virtually ceased. But the gigantic

slick, already about 60 miles long and 20 miles wide, which has formed as a result of the discharge of oil is continuing to move South and is close to the Saudi Arabian coast, a REUTER telegram says.

Commenting on this report at IZVESTIYA's request, Doctor of Juridical Sciences Kamil Bekyashev, chairman of the Soviet "Peace to the Oceans" Committee's ecology commission, said:

"This 'self-defense' measure undertaken by Iraq is the most flagrant violation of the basic principles of international law and should be resolutely denounced by the world community. Saddam Husayn, having given the order, in this case has violated commitments envisaged by many international conventions. In particular the 1972 convention on the prevention of the pollution of the sea by effluent and other materials bans the discharge or pouring into the sea of crude oil and its by-products, refined petroleum products, oil refining waste, and also of compounds containing any of these substances. By virtue of its universality this convention is binding for all states. By its illegal behavior Iraq has also grossly violated the Kuwaiti 1978 regional convention on cooperation in the field of protecting the marine environment from pollution (it has been acceded to by seven countries including, as of 1 July 1979, Iraq). This convention, in addition to banning the discharge of harmful substances into the sea, demands that its signatories take appropriate measures to prevent and reduce pollution of the marine environment. Thus, for its ecological crime (ecocide) Iraq must bear responsibility in international law. No references to the principle of necessity can justify its actions not only against the natural environment but also against the inalienable right of the region's inhabitants to a healthy life. The littoral and other states have the right to demand that Iraq restore to them the former cleanliness of the water and coast. In brief, it is a case of compensation payments of hundreds of billions of dollars."

Soviet Specialist Views Ecological Threat From Burning Gulf Oilfields

*PM2801145591 Moscow IZVESTIYA in Russian
25 Jan 91 Union Edition p 7*

[Interview with Mikhail Leontyevich Surguchev, corresponding member of the USSR Academy of Sciences, by I. Andreyev under the "Scientist's Opinion" rubric; date and place not specified: "Threat Posed by Oilfield Fires"]

[Text] At IZVESTIYA's request, the eminent specialist M. Surguchev, corresponding member of the USSR Academy of Sciences and general director of the Nefteotdacha Intersector Scientific and Technical Complex, comments on the situation.

"When the events in the Persian Gulf were still developing," Mikhail Leontyevich said, "you could often hear people talking about the blow that possible hostilities could deal to the world oil market. In my view, however,

that danger was greatly exaggerated. Judge for yourself: Iraq and Kuwait produce 220-230 million tonnes of oil a year. A shortfall which could be met by Saudi Arabia. But if oil extraction throughout the region were knocked out, leading to an unprecedented crisis and a massive rise in prices for raw materials and fuel, that would be a different kettle of fish. However, even with such a development of events, our country, whose policy is based on self-sufficiency in oil, would not suffer serious economic harm.

"There are approximately 1,100-1,200 wells operating in Iraq and Kuwait, each of which produces about 800-1,000 tonnes of oil a day. Stocks at Kuwait's Big Burgan oilfield—the second largest capacity in the world—alone stand at 7-8 billion tonnes. The Saudi field of Ghawar, the largest in the world, contains 10-12 billion tonnes. This represents enormous quantities of combustible material each tonne of which would produce 12,000-15,000 cubic meters of smoke and 200-300 kg of soot.

"It is hard to believe that the cutoff valves which prevent damaged wells from gushing would work if the oil regions were bombed or sabotaged. Even a hundred wells out of control where fires would start immediately can discharge a vast quantity of combustion products into the upper layers of the atmosphere. How would the fires be extinguished and who would do this when there are hostilities being waged? I remember the fire at the Tengiz oilfield in Kazakhstan which took a year to extinguish. And that was in comparatively favorable conditions when the casing and pipe surrounding the well were intact! But there is no guarantee that oil well equipment would survive an air or missile attack.

"The discharges from the burning oilfield would fall over large areas of the region and undoubtedly reach as far as our Transcaucasus several hundred kilometers away. It is not enough that many tonnes of soot would fall on that territory—the carbon dioxide in the atmosphere would considerably alter the dispersal of solar energy. And that means the greenhouse effect, whose dangers have been much described in the industrial context.

"The destruction of the offshore oil installations could have an even more dramatic effect. At the very least the Persian Gulf would be covered not by a film of oil but by a dense layer if that happened. Given how difficult it is to clean up even a small area of water, it is impossible to predict the consequences of pollution on so vast a scale.

"It is not too late for all the participants in the conflict that is currently in full swing to give thought to that."

Soviet Chemical Troops Chief Dismisses 'Iraqi Chernobyl' Threat

PM2301164791 Moscow RABOCHAYA TRIBUNA in Russian 24 Jan 91 p 3

[Nikolay Panyukov report: "Truth About Iraqi 'Chernobyl'"]

[Text] Reports that the multinational forces in the Gulf are striking against Iraqi nuclear research centers and

chemical and bacteriological weapons dumps have caused alarm among readers.

"The only thing people are talking about at the moment is the 'Iraqi Chernobyl,'" V. Marfin of Simferopol stated, sharing his fears. "What currently is the radiation, chemical, and bacteriological situation on our country's southern border?"

Here is what Colonel General S. Petrov, chief of the Chemical Troops, said on this subject:

"Of course, there is and can be no question of an 'Iraqi Chernobyl.'

"As for strikes against chemical weapons plants and chemical weapons dumps and storage bases, these could cause major losses above all among the local Iraqi population. For the Soviet Union there is virtually no such danger.

"The situation concerning bacteriological weapons is more complex. Strikes against installations producing such weapons could lead to outbreaks of various epidemics—first and foremost, of course, on Iraqi territory. There could be outbreaks of anthrax, plague, cholera, and various kinds of fever, as well as vectors of various diseases that are entirely unknown to us... Since epidemics, as is well known, do not recognize borders, such acts could create a threat of a complex bacteriological situation for neighboring states.

"That is the reality. But, obviously, we should also state the following: In launching strikes against such installations the anti-Iraqi side would essentially be embarking only indirectly on the use of weapons banned under the 1925 Geneva Protocol and the 1972 Convention.

"Nobody should forget that 110 states, including states in the anti-Iraqi coalition, have signed these documents."

Soviet Official Calls Baghdad Reactor Danger 'Not So Significant'

PM2201203391 Moscow IZVESTIYA in Russian 23 Jan 91 Union Edition p 4

[Interview, date and place unspecified, with Rostislav Nikolskiy, chief of the USSR Gospromatomnadzor's Research Reactor Safety Supervision Sector, by correspondent A. Illesh under the rubric "Our Commentary": "Following the Attack on a Nuclear Reactor"—first three paragraphs are editorial introduction]

[Text] One of the first reports about the USAF attack on Iraq was that at 0130 GMT almost all Iraqi nuclear installations had been destroyed. Slightly later it was stated that a nuclear center near Baghdad had been put out of action... What follows from this?

The destroyed reactor is not just any old destroyed installation. Its ruins themselves pose a deadly danger. But how concrete and great is that danger and what could be the possible consequences—these questions concern us because a five-megawatt "RT"-type research reactor built by Soviet specialists could (according to provisional information) have found itself in the attack zone.

Our correspondent A. Illesh turned for a comment to Rostislav Nikolskiy, chief of the USSR State Committee for the Supervision of Safe Working Practices in Industry and Atomic Power Generation's Research Reactor Safety Supervision Sector.

[Illesh] What is your assessment of the possible development of events following the destruction of the nuclear research reactor?

[Nikolskiy] First and foremost, I would say that in this case contamination of the area around the reactor as well as the population depends on several factors: Was the Iraqi RT (a pool-type reactor) working or had it been shut down?

But before giving possible figures I would note that in principle the scale of contamination to people and the surrounding area after accidents at reactors of this size and type are not so significant. In any event they cannot be compared to the Chernobyl tragedy. And during the "special period" that a war undoubtedly is such installations should be shut down...

[Illesh] I know that there is a reactor similar to the Iraqi research reactor in the USSR—near Riga and belonging to the Academy of Sciences...

[Nikolskiy] Quite so. It too, naturally, has currently been shut down. In Moscow, for instance (and IZVESTIYA has already written about this), there are far more powerful reactors. Two specialists would be quite capable of "shutting down" [razobrat] a five-megawatt RT in a single day...

[Illesh] Let's get back to the possible area of contamination. What are your forecasts?

[Nikolskiy] In our forecasts we have proceeded on the basis of the worst-case scenario—the reactor was charged with fuel and was operating during the attack. In such a case its destruction and the burning off of the fuel outside the building could result in the release of radioactive iodine, inert gases, cesium, a minimal amount of strontium, and an even smaller amount of plutonium.

[Illesh] Could you give us an example of just how dangerous this would be?

[Nikolskiy] Calculations carried out on reactors of this type (and our specialists have all these calculations ready—not for the event of war, but for "civilian" accidents such as a plane crash or some kind of explosion) show that the internal irradiation of an individual at a distance of 100 meters would be not more than 1 rem, and external irradiation not more than 0.3 rems.

Internal irradiation in this instance is calculated on the basis of the radioactive iodine. Specialists encountered it on a large scale at Chernobyl.

[Illesh] But after our accident such figures sound simply reassuring...

[Nikolskiy] I would repeat that, in terms of its physical characteristics, the RT cannot compare with the large power-generating reactors used in the national economy. One other important detail: If the core is destroyed the fuel temperature is low (around 500 degrees), whereas at the notorious high-power pressure-tube reactors temperatures can reach 1,500 degrees. And the higher the temperature, the greater the discharge of fission products.

[Illesh] Physicists have told me that the possible area contaminated would be no more than one kilometer. Do you agree with that view?

[Nikolskiy] Yes, I more or less agree. In general, I think that in Iraq it will only be a question of the reactor building being destroyed and contaminated. Nothing more. Of course, the research reactor would be completely lost and the personnel might be contaminated... [Nikolskiy ends]

...On my own behalf I would like to offer readers another theoretical version of the development of events over there. It would be possible, as they say, if a lot of mistakes had been made. If they had been trying to use this research reactor in Iraq to develop "charges" for bombs (which, because of the RT's technical characteristics, is unlikely), if a plutonium stockpile was located alongside, and if during the U.S. attack the reactor was indeed at work to this end, then... then the degree of danger to the population and the actual dimensions of the disaster would change fundamentally.

More on Japanese Government Discussion of Response to Oil Spill

OW2901143491 Tokyo KYODO in English 1130 GMT 29 Jan 91

[Addition to an item published in the 29 January JPRS REPORT: ENVIRONMENTAL ISSUES, JPRS-TEN-91-002, page 58, headlined: "Japanese Government Continues To Discuss Response to Gulf Oil Spill"]

[Text] Tokyo, Jan. 29 KYODO—Meanwhile, Foreign Ministry spokesman Taizo Watanabe told reporters that Japan wants to do "whatever possible to block this outrageous attempt to pollute the Gulf."

Watanabe said that before the oil booms could be sent, Japan must first conclude an agreement with the Saudi Arabian Government and "overcome technical problems."

Those problems were believed to be related to discussions between the government and the oil industry, as well as logistical problems in transporting the massive barriers.

Foreign Ministry sources said there are also several schemes under consideration by which specialists, such as those from the Japan International Cooperation Agency, could be sent to Saudi Arabia.

But the sources stressed that it is not yet certain whether such a dispatch of personnel will actually be realized.

On the possibility of dispatching the government's natural disaster relief team, one source said it would not be possible in the present case as the leakage of oil into the Gulf is a man-made disaster rather than one which occurred naturally.

FRG Offers Qatar 'Aid Package' To Fight Oil Slick

LD2901134891 Hamburg DPA in German 1254 GMT 29 Jan 91

[Excerpt] Bonn (DPA)—The Federal Government has offered the Qatari Government an "aid package", worth 5 million Deutsch marks, of special equipment to fight the oil slick in the Persian Gulf. The Foreign Office also announced in Bonn today that this involves equipment from government and laender stocks which will enable the oil slick to be fought from land and sea.

The Federal Government shares the worldwide concern about the oil disaster in the Gulf and is prepared to make a contribution to lessen the ecological consequences, the foreign office said. It has taken over the coordination of German aid measures. This also involves the coordination with the EC partners and within the framework of the International Maritime Organization (IMO) in London.

Five containers with specialist equipment to fight oil are standing ready in Cuxhaven for use in the Gulf. They can be transported by air to the disaster area. The kind of aid measures sent depends on the wishes of the experts from the United States and Saudi Arabia who are in Qatar.

It is not expected that German ships for fighting the oil slick will be sent in the foreseeable future. [passage omitted]

Yemeni Environmental Organizations Issue Appeal on Gulf War

EA2901185091 Aden Domestic Service in Arabic 1630 GMT 28 Jan 91

[Text] Our country's Council for Environmental Protection has appealed to all countries and all regional and international organizations as well as scientific establishments specializing in environmental matters to act

immediately to stop the destructive war in the region and to contain its disastrous environmental effects before matters get worse.

In a meeting held today under the chairmanship of Engineer Muhsin 'Ali al-Hamdani, minister of state and chairman of the Council, the Council pointed out that the flow of oil into the marine environment in the Arabian Gulf threatens marine life and fish as well as water destined for drinking in the Gulf states. The council warned against setting the oil ablaze because this would lead to [words indistinct] and constitutes a threat to the atmospheric and agricultural environments and sources of drinking water.

Meanwhile, the constituent committee of the Yemeni Association of Friends of the Environment issued a statement today stressing that the imperialist assault on the Arabian Peninsula and the Gulf not only aims at destroying Iraq's military and economic resources, but could also lead to the destruction of all capabilities and infrastructures of life for the peoples in the region, particularly with regard to the deterioration of the environment [words indistinct] and effects of the war for (?many) years to come.

Malaysian Environment Team Ready To Help Combat Gulf Oil Slick

BK3001103691 Kuala Lumpur BERNAMA in English 0843 GMT 30 Jan 91

[Text] Kuala Lumpur, Jan 30 (OANA-BERNAMA)—The Department of Environment (DOE) is willing to send its team to help fight the war-triggered oil slick in the Gulf if there is a request for it.

DOE Director General Dr. Abu Bakar Jaafar said Wednesday he would strongly recommend to the government that Malaysia send a team in view of the experience the team stood to gain.

"Although we have limited resources and personnel, the experience would be very valuable for the oil slick combat team in the department," he said.

Dr. Abu Bakar was commenting on an appeal from the Government of Iran for international organisations to help fight the huge oil slick that has threatened the Gulf.

The spillage, which started around Jan 19, has sent an oil slick 56.35 km by 16.1 km down the eastern coast of Kuwait and Saudi Arabia.

The United States claimed the Iraqis had released the thick black crude oil deliberately in an act of "environmental terrorism," but Iraq charged that the slick was the result of allied bombing.

Dr. Abu Bakar said so far the department's oil spill contingency plan team had had some experience in fighting oil slicks in the Straits of Melaka.

INDIA

Police Halt Anti-Dam Demonstrators

BK0501044691 Hong Kong AFP in English 1821 GMT
4 Jan 91

[Text] New Delhi, Jan 4 (AFP)—Police beat back and arrested more than 100 protestors who tried to enter the western Indian coastal state of Gujarat Friday to march on the site of a huge dam project they want scrapped.

Police used force to halt the slogan-chanting protestors, mainly tribespeople who had their hands tied behind their backs in a symbolic demonstration of their non-violent intentions, the PRESS TRUST OF INDIA (PTI) said.

The news agency said a "number of people" were injured in the police action, followed by the arrest of 124 protestors who tried to march on the site of the Sardar Sarovar Project (SSP), conceived as the world's largest river dam.

The protestors were from among the nearly 5,000 anti-dam activists who have been camping on the border of Gujarat and Madhya Pradesh states since New Year's Eve after a week-long march against the SSP.

Gujarat authorities have imposed a ban on public assemblies to thwart the anti-dam activists, who include conservationists, villagers facing eviction from their ancestral lands, tribespeople and farmers.

Hundreds of supporters of the dam, partly financed by the World Bank and Japan, have formed a human wall across the border to prevent the entry of the marchers into Gujarat.

The anti-SSP activists are led by Baba Amte, an internationally renowned crusader on environmental and social issues, who has called the project a symbol of "destructive development."

Environmentalists have charged that the SSP would submerge nearly 40,000 hectares (100,000 acres) of rich forest and fertile farmland and oust some 100,000 people from their ancestral homes.

They charge that the government has no plans for the rehabilitation of residents risking displacement and that the possible destructive impact on downstream ecosystems has not been studied.

Supporters of the dam call the SSP a harbinger of prosperity with immense potential for irrigation of a drought-prone region and electricity generation.

IRAN

Sale of Lead-Free Gasoline Begins

91AS0305Z London KEYHAN in Persian 6 Dec 90 p 2

[Text] From Saturday of this week (24 November) in 13 gasoline stations in Tehran, the sale of lead-free gasoline began. The price of lead-free gasoline with a coupon is 30 rials per liter and 60 rials at the open market price.

Engineer Fathinezhad, the general manager of the national distribution and oil products company, announced that this type of gasoline has been purchased from abroad. He did not reveal the name of the country selling the lead-free gasoline.

The import of lead-free gasoline indicates the level of technical backwardness of the National Iranian Oil Company in the years since the revolution.

Officials Outline New Public Health Law

PM0701130591 Moscow IZVESTIYA in Russian
4 Jan 91 Union Edition p 4

[Interviews with A. Kondrusev, USSR deputy health minister and USSR chief state public health inspector, and Academician of the USSR Academy of Medical Sciences Yu. Borodin, chairman of the USSR Supreme Soviet Public Health Committee, by L. Ivchenko: "My Public Health Inspectorate Protects Me"]

[Text] ...In December 1989, as a result of a leak of toxic substances from the territory of Gorlovka Chemical Plant, workers at the Aleksandr-Zapad Mine were poisoned by chlorobenzene and the mine galleries were polluted. A government commission went to work. The disaster, it became clear, had been slowly brewing for a long time. The oblast public health and epidemiology service had repeatedly demanded that officials adopt urgent measures in connection with the leak of toxic substances and had even submitted materials to the rayon prosecutor's office. But the office confined itself merely to warning the plant administration. And what else could have been done? The violation of norms and rules is not the same as breaking the law...

That is why today the draft "Fundamentals of USSR and Union Republic Public Health Legislation" elaborated in the USSR Ministry of Health are so topical. The complex environmental health situation in the country is prompting justified complaints from people, who are demanding that public health oversight be stepped up.

"We are still being guided in our work by a plethora of ordinances which are often obsolete," A. Kondrusev, USSR deputy health minister and chief USSR state public health inspector, said. "They do not reflect the changed public health, epidemiology, and radiation situation, the threat of the spread of AIDS, and the contamination of food products by pesticides, nitrates, and other substances dangerous to people's health. And all this naturally has an effect on people's health. It is no accident that since 1971 the overall death rate has grown from 8.2 per 1,000 inhabitants to 10.1, and we are in 54th place out of 60 developed countries as regards male life expectancy and 47th as regards female life expectancy. If 40 million people in our country live in cities where air pollution is 10 times the norm, what kind of health can we expect? And indeed we cannot call the epidemiological situation satisfactory either; outbreaks of infection appear now in one place, now in another, and public health inspectors put out these 'fires,' but the seats of the fires still smolder... Infectious diseases cost the country huge sums every year—in 1989 the damage resulting from them totaled 8 billion rubles [R]."

[Ivchenko] But what does public health legislation change here?

[Kondrusev] A great deal! Partly because it gives the public health inspector the right to punish violations of the law. For the public health inspectorate essentially has

no rights at the moment: The most it can do in a rayon, for example, is to fine people around R10, which no one considers to be real money any more. An "oblast-scale" fine is R30. Imagine: A certain culinary production unit poisoned hundreds of children with its cakes, but the culprits were fined just R10... The cooks at a school cafeteria in Snovitsy, a suburb of Vladimir, gave the children cutlets that hospitalized 130 young schoolchildren the next day... Or another example: An enterprise pollutes a river, which entails incalculable consequences for the environment and people's health, but the public health inspectorate does not have the right to close this production unit if it is one of union significance: There is a resolution that prohibits this unless it has been agreed with the USSR Council of Ministers. One resolution excludes another, thus restricting the rights of the public health inspector. No organization will be able to neutralize a law, and it gives the public health inspectorate the right to adopt the most severe measures and punish the culprits according to the violation. The inspectorate answers only to the law.

[Ivchenko] What are the sanctions envisaged by the document for violations?

[Kondrusev] The size of the fines is being sharply increased—up to R1,000. Incidentally, this money will be spent on improving conditions at the installation or the environment, and creating conditions for a healthy way of life. And if there has been direct damage to health, then the culprit who violated public health legislation must pay compensation for it. The draft law also provides for cases where materials will be referred to the prosecutor's office. So that the effectiveness of the measures will be high.

A great deal of time and work was put into this draft law. Union republic governments and supreme soviets and republic health ministries participated in discussing it, and the observations made by specialists and the medical community were published in the press. The republics reacted with approval to the draft law and unity of positions and mutual understanding were reached. [Kondrusev ends]

"This is very important," Academician of the USSR Academy of Medical Sciences Yu. Borodin, chairman of the USSR Supreme Soviet Public Health Committee, said. "After all, infection knows nothing of borders and nationalities. In a situation where we are moving toward the market and where interrepublic and international contacts are being expanded and a common economic space is being created, unified public health norms and requirements are needed for goods, products, and conditions. Otherwise infection will rampage around the country, if there is no unified strategy or tactics for repulsing it. Take even the factor of private enterprise, including the preparation of food products. The manufacturer bears responsibility for the quality and safety of his products. But now he will have to answer in accordance with the law."

[Ivchenko] Could you list the most important provisions in the new document?

[Borodin] First, the right of citizens to a favorable environment has been clearly defined. And this is by no means pandering to legislative fashion, but an attempt to make the draft law serve the individual. It is obvious that in order to preserve their health, people must live in conditions that do not have a harmful influence on them or on the health of future generations and that are satisfactory from the public health and epidemiological viewpoint and safe so far as radiation is concerned. To ensure that this law does not become just another declaration, guarantees have been envisaged for its implementation—primarily citizens' right to receive full and reliable information on the state of the environment and on plans and decisions whose implementation may affect it and the population's health. This is the second innovative aspect. Remember what happened with Chernobyl, when the press found it difficult to obtain information that was being hushed up and kept from publication. The law imposes an obligation to allow extensive coverage of things that were more often than not closed to the press.

As we can see, the document is democratic and extends the rights of the individual. The draft "Fundamentals of Public Health Legislation" also envisages the juridical liability of enterprises and organizations for the state of the environment and proposes to enshrine citizens' rights to compensation for damage to their health caused by any types of contamination of food products or installations. And another important provision—the law makes the State Public Health Inspectorate independent.

'Peace to Oceans' Committee Official Outlines Plans

PM1001110791 Moscow IZVESTIYA in Russian
8 Jan 91 Union Edition p 6

[G. Charodeyev report: "A Cruiser called 'Greenpeace'?"]

[Text] The Soviet "Peace to the Oceans" committee has announced that it is starting to collect money for the construction of a ship—a floating research center which will bring together the most eminent scientists and specialists concerned with problems of the world ocean.

We need about 60-70 million rubles, Prof. Kamil Bekyashev, deputy chairman of the committee, said in conversation with your IZVESTIYA correspondent. Sometimes the future ship is compared with the ship of the Greenpeace international environmental organization. However, we intend to give the 500 places not just to environmentalists, but also to specialists in the spheres of maritime law and disarmament, shipbuilders, the military, and representatives of the church, public organizations, trusts, and ministries—everyone connected with the resolution of the problems of peace, disarmament, and environmental safety at sea.

Our intention is that the "Peace to the Oceans" Committee's ship will be afloat for practically the whole year. We plan to organize international symposia, conferences, scientific research work, expeditions, and exhibitions on board...

Talks are now going on with a number of large foreign firms that could build us a ship in their shipyard. However, it is not out of the question that the committee will buy some kind of converted military cruiser from the Soviet state.

"Peace to the Oceans" is a new nongovernmental public organization. USSR citizens and state and public organizations and enterprises sharing our aims and tasks can participate in it.

Greenpeace Registration in USSR Planned for January

PM1401110291 Moscow SOVETSKAYA ROSSIYA
in Russian 9 Jan 91 First Edition p 2

[TASS report: "'Greenpeace' in the Soviet Union?"]

[Text] The first foreign social organization to be registered in the Soviet Union will probably be the international ecological movement "Greenpeace Foundation." Representatives of the committee founded in Moscow to organize the movement's legalization reported that its registration is planned for as early as January.

"Greenpeace" is known throughout the world for its active stance with regard to the protection of the environment. In a number of countries the movement enjoys considerable popular support. For example, in the recent elections in the Australian states, representatives of ecological organizations achieved certain successes. It is not by chance, therefore, that it is Australia that provides the cochairman of the organizational committee V. Macdonald, who is president of the firm "Earth Care."

"The first action of 'Greenpeace' in the Soviet Union was to release a record by popular singers in 1988," V. Macdonald said. "Now we are planning a number of other measures, for example setting up the production of environmentally clean food products for Moscovites at the Moscow region kolkhoz Zarechye-3. We are receiving great assistance from our sponsor—the joint-stock company Russian Commodities and Raw Materials Exchange. In particular, it will help us bring out a magazine in the Soviet Union."

Ecologists Start Campaign for Flying Ozone Factory

PM1101105391 Moscow Central Television First
Program Network in Russian 0330 GMT 9 Jan 91

[From the "120 + 30 UTRO" program: Report on efforts to save ozone layer by unidentified correspondent,

excerpt begins at 0450 hours and 15 seconds, and ends at 0451 hours and 40 seconds—passage omitted, talking heads only]

[Excerpt] [Announcer] The organizational committee of the worldwide movement "Ecological International" has announced the beginning of a fund-raising campaign for a flying apparatus to save the Earth's ozone layer.

[Unidentified correspondent] For exactly a year, beginning last Christmas, Soviet scientists have been gathering information on the state of the Earth's ozone layer using this military reconnaissance aircraft. [video shows aircraft]

Their conclusion is simple. The ozone layer must be patched up; the ozone reserves have to be replenished. However, this small research aircraft cannot cope with such a global task. What will replace it?

[Unidentified speaker] One option is the construction of a powerful flying apparatus capable of producing around 1 million tonnes of ozone over three months at altitudes of up to 30 km.

In cooperation with enterprises such as the Myasishchev Plant, the Energiya Science and Production Association, the Central Aerodynamics Institute named for N.Ye. Zhukovskiy, and the Flight Research Institute, we are drawing up proposals to be submitted to the United Nations. This project could be implemented, in my opinion, within the next five to ten years, jointly, through the pooled efforts of scientists, the military-industrial complex, the United States, and other developed countries. [passage omitted, talking heads only]

Reform of Disaster Rescue Arrangements Urged

PM1001152591 Moscow KRASNAYA ZVEZDA
in Russian 10 Jan 91 First Edition p 1

[Article by Rear Admiral M. Povedenok, deputy commander of the Northern Fleet for Civil Defense, under the "Soviets and Garrisons" rubric: "Have We Profited From the Bitter Lessons?"]

[Text] Chernobyl, Arzamas, Armenia... Today these names make up a kind of depressing geographic picture of the tragedies that shook our country in the past few years. And not so long ago there were more explosions, this time at the artillery depots of the Pacific Fleet. And this bitter cup did not pass from Severomorsk, when the glow of a fire once rose above the arms depots.

It would seem that these bitter lessons should have convinced everyone by now that today no one is insured against such accidents that occur through human error or just naturally. Furthermore, experience shows that in such cases many casualties and much material damage could have been avoided if people capable of swiftly and professionally implementing a carefully prepared plan of measures as needed to ensure the safety of personnel and the population and to eliminate the consequences of the

accident had combated these disasters. But the obviousness of the need for cardinal changes and recognition of their expediency is still no guarantee that the intended measures and plans will be carried out.

Several decades ago a system for basing Northern Fleet ships started being drawn up. And at that time the main criterion was favorable geographic deployment, which was necessary for the speediest building work. What happened as a result? Today there are several basing facilities for nuclear submarines or ships in the Northern Fleet. The living quarters are located either directly at the mooring or a just few kilometers away. At some basing facilities stores of armaments, fuels and lubricants, and other inflammable materials are within the boundaries of the living quarters. And all because the development of the camp infrastructures proceeds without taking into account the population's real safety. Over 180,000 people, about 30 percent of whom are children, live in such potentially dangerous garrisons in the North alone.

Unfortunately, not a single person out of the 180,000 can be sure that, if there were some kind of accident, their safety would be guaranteed. Moreover, it has to be stated that the officials in local authorities who are supposed to provide this safety (civil defense chiefs and chiefs of staff) have practically avoided fulfilling their duties. There are numerous examples of this.

In the majority of potentially dangerous areas there is a lack of the necessary number of anti-radiation preparations. And even if some stocks have been built up, they are stored centrally and it would be impossible to use them in extreme conditions on time. There is a similar picture with the provision of individual protection facilities for the population. Even in Severomorsk—the Northern Fleet's capital—the local authorities have not bothered to supply the necessary quantity of gas masks, even for the children. Those that they do have are being stored in one single depot, and it would take about 12 hours to supply them if they were needed. And if something happened on a day off or during the night, you would not be able to sort anything out—there would be no one on duty at the civil defense center, which is subordinate to the city authorities.

The permanent emergency commissions recently formed within the soviets are not doing the job either, because they are capable of establishing what has happened only after the event. And the whole burden of responsibility and the job of carrying out work to eliminate the consequences of an emergency, including protecting the civilian population, rests with the Fleet structures. This activity on the part of the emergency commission is quite understandable if you look at its planning group—which is the same collective "brain" that is supposed to predict all eventualities and emergency situations and form a plan of action for every option. There are all kinds of posts in this group. There is even an acting head of the cultural department and a chief accountant... But somehow they have forgotten to include specialists in it.

Obviously the state of affairs in civil defense must be urgently changed. There are possibilities for this. Well organized cooperation between the local garrison defense staff and the permanent emergency commission could be very beneficial here. Today in every garrison the local defense staffs are prepared to give assistance to the commissions in planning and elaborating joint action, providing facts and up-to-the-minute information to all types of intelligence, compiling unified working documents, and preparing nonstaff civil defense formations. The Fleet command and garrison chiefs have frequently suggested that a single leadership staff be created to eliminate the consequences of emergency situations and even that protective equipment and means of communication be supplied for this purpose. And every time these proposals have gotten lost in the corridors of local organs. Is it worth waiting for the next bitter "lesson"?

Military Official Views Naval Reactor Safety

91UM0197A Moscow KRASNAYA ZVEZDA in Russian
20 Dec 90 First Edition p 2

[Article by Captain 3rd Rank Yu. Gladkevich, KRASNAYA ZVEZDA correspondent: "Nuclear-Powered Ships in the Bay. Is This Dangerous for People and the Environment?"]

[Text] When things have to do with radiation safety many of us abandon common sense and restraint. Calls to make an end to use of both the "peaceful" and the "military" atom, and radiation phobia as a factor in public awareness, are becoming normal signs of our life today. The Chernobyl tragedy, the decades of silence about the radiation situation in the country, and fear of future ecological disasters fully explain the flare-up of public attention to this important problem. But can we justify the attempts to depict our nuclear objects as deliberately dangerous misfortunes that inflict harm on both nature and man?

The formation of nuclear-powered submarines where Rear Admiral V. Rodionov serves is based at a small settlement on the littoral of the Pacific Ocean. But not far away from this is a quite large city, and the ocean waters washing the littoral are rich in fish and other maritime products. Because of this, the submariners have repeatedly had to explain things both to representatives of the local authorities and to activists from public organizations and associations of citizens, proving that the nuclear-powered vessels are in no way exacerbating the radiation situation in that region.

Three times this year, reacting to inquiries from the public, commissions have worked in the unit. The last of them—an interdepartmental commission—was also the most representative: USSR and Russian Soviet Federated Socialist Republic [RSFSR] people's deputies, members of the Emergency Situation Commission, specialists—medical personnel, chemists, ecologists... They checked everything—observance of radiation safety

rules by the submariners—and they took control readings on the territory of the base and the piers, at nearby bodies of water and in residential zones, and at other objects. And this is the conclusion they reached: No radiation in excess of background radiation was found...

Notwithstanding, I opened my interview with the chief of the radiation safety service for the unit, Captain 1st Rank K. Petrov, with this question: Is it really true that everything is all right?

"Of course, the nuclear reactor in a submarine is a source of heightened danger. And from time to time there is trouble." Konstantin Yuryevich opens his notebook. "Here. On one occasion, without proper consultation with the specialists, the scientists grossly violated the requirements of the manual and cut open one of the boats to conduct studies of the pipelines. But they failed to take into account the fact that there are so-called stagnant zones along sections of the pipelines where radioactive "dirt" settles. And they pulled this dirt out through the space. As a result, personnel of the radiation safety service spent a month decontaminating the boat. It was only thanks to the immediate steps taken that the safety of the submarine's crew was ensured, and the safety of the careless researchers themselves. At that time we avoided irradiation of people..."

But in general, Captain 1st Rank K. Petrov asserts, they have not had to deal with any serious emergencies in the unit. Partly because from the moment it was set up, the radiation safety service has been operating in a very disciplined and organized way, observing the rules of radiation safety.

The chief of service presented some statistics. Here, for example, is a comparative analysis of radiation doses for personnel for 1988 and 1989. Annual individual doses did not exceed the permissible level or control doses. The integrated index for radiation safety was several times less than the control figure. Compared to the natural background, the radiation background was only one order of magnitude greater, which is virtually harmless for people and the environment. The reason for the elevation was the nuclear tests held at Chinese test sites.

Some might suggest that perhaps these figures are deceptive. For previously it has so happened that public opinion has been calmed by using comparative indexes, but a check showed that those indexes had just been made up and did not reflect the real picture...

But here is how the control figures for radiation doses for personnel have changed. When our nuclear-powered fleet was first being set up, the manuals for radiation safety set the maximum permissible dose of external radiation at 50 REM per year. Later, as experience and a better scientific understanding of the effect of radioactive irradiation on the human body were gained, the dose was set at 15 REM. It has now been lowered again, and for those people engaged directly in handling the nuclear reactor the dose is only five REM.

"We have everything we need to monitor the situation reliably on our nuclear-powered vessels and on the piers and the base," claims Captain 1st Rank K. Petrov. "The laboratory is equipped with highly sensitive instruments for radiation and radiobiological monitoring of ships and objects in the environment, and of the laboratory equipment. Automated recording of the technical condition of measuring equipment has been put in place, and this enables us to organize the smooth operation of work to check and repair instruments..."

In fact, in technical terms the radiation safety service is equipped in a way that is the envy of other services in the country dealing with similar tasks. Equipment is purchased with the assistance of a Union company that enjoys great authority both within the country and in the foreign market. The radiation safety service possesses some unique equipment. In particular, multichannel amplitude analyzers that make it possible to identify radionuclides with a high degree of accuracy, apparatus for radiobiological monitoring of personnel... There is much else that in general determines the radiation safety service's high level of readiness to carry out its tasks.

As often happens with us, however, the service's strict dependence on higher organs and on central deliveries of all kinds of supplies, and the norms set for supplies, sometimes restrict the service's opportunities and even hamper its ability to develop operationally in a direction that a situation may demand.

The radiation safety service acquired a computer two years ago. A computer makes it possible to monitor many technological processes, and to set up many of the routine tasks on it and reduce to a minimum the time spent resolving them... But alas! it has still not been possible to do this. For the computer came to the radiation safety service in a package with spectrometric apparatus and was designed to solve a narrow range of special problems, namely spectrum resolution making it possible to determine the health or sickness of a submarine reactor. And in accordance with the norms, a certain software package was sent along with it. In other words, the software does not allow them to make full use of the computer's possibilities. A system of "delivering" programs to consumers in the fleet is only just starting, and we cannot count on any rapid results here.

Because of its status the radiation safety service cannot order software "on the side," even though opportunities do exist for this—there are many programmers in the region capable of fulfilling such an order to a high standard. Perhaps the fleet chemical service could act as the client, but it obviously already has enough problems of its own. However, realizing how difficult it now is to find funds, and substantial funds at that (computer programs are not the cheapest kinds of goods), in the fleet's modest budget, the radiation safety service collective is prepared to earn the necessary funds for itself.

There is a demand in the region for providing services to the public and to enterprises and organizations for

radiation inspections of objects in the environment—water, soil, seaweed, the air, precipitation—and for radiometric analysis of foodstuffs. And the radiation safety service headed by Captain 1st Rank K. Petrov could, not for free, of course, "launch" these kinds of services in the market.

"Our collective is not big enough to allocate our own specialists for this purpose," Konstantin Yuryevich reflects, "but there are enough of these kinds of specialists available in the region at civilian enterprises and organizations. And in cooperation with them—our equipment and maintenance personnel 'on the side'—we could perhaps set up the work..."

Do we need to convince anyone that this proposal makes sense, particularly taking into account the approaching market and the reductions in the military budget. The radiation safety service could not only earn what it needs to improve its own base but also significantly augment the income side of the fleet's budget. One small thing remains—obtaining the permission of the navy command to engage in this, let us say, commercial activity.

I am not inclined to advise that the radiation safety service be given the right to engage in activity of this kind without taking a good look at it. But I do think that it is necessary to consider it. To recruit combat training specialists and financial experts to calculate all the advantages and disadvantages of this kind of "conversion" for the radiation safety service. And indeed, in addition to the radiation safety service there are many units and services in the fleet capable of being involved in this kind of conversion. And not only without any harm to combat readiness, but even to its advantage.

"And for us," Captain 1st Rank K. Petrov says in conclusion, "it would enable us to carry out our main mission even better—ensuring reliable monitoring of nuclear-powered vessels and radiation safety in the zone entrusted to us..."

Chernobyl Nuclear Plant Director on Planned Shutdown

LD0401121591

[Editorial Report] Moscow Domestic Service in Russian at 0900 GMT on 4 January carries a five-minute interview with (Mikhail Panteleyvich Umanets), director of the Chernobyl Nuclear Electric Power Station [AES]. (Umanets) sums up measures taken since the April 1986 accident to enhance the safety of the AES: plant personnel have been "almost fully" replaced; the new personnel received two and a half years of training; and a government oversight commission has been set up by the Ukrainian and USSR Supreme Soviets.

"At present this commission is considering the concept of shutting down the Chernobyl AES," (Umanets) says. "The general outlines of this concept have already been designated, and the deadlines for shutting down each reactor have been set. The first block is to be shut down

in the second half of 1993; the second reactor in 1994; and the shutting down of the third one is scheduled for 1995."

Speaking about the adequacy of the sarcophagus encasing the damaged fourth reactor, (Umanets) says that many tests relating to nuclear safety and the structural stability of the reactor have been carried out. The tests have shown that "at present the existing casing is not hermetically sealed. And therefore there are suspicions that if any damage occurs inside the casing in the old structures off the fourth reactor, there may be a radioactive leak." (Umanets) quickly adds: "Nothing like the one that happened that April, of course; but it may complicate the radioactive picture very badly." At present, he says, "over the existing casing, a second one—stable and air-tight—is being built. It will have good monitoring equipment and is designed to last for hundreds of years."

The overall performance of the AES is unsatisfactory, according to (Umanets). This year, for example, it has generated about 16.5 billion kwh of energy; and this is not a lot, (Umanets) says, considering that the annual designed capacity for this type of reactor is about 21 billion. "In this connection, our economic situation is very serious," (Umanets) concludes.

Chernobyl Nuclear Plant Cooling Pump Shuts Down in Emergency

PM1001222191 Moscow *RABOCHAYA TRIBUNA* in Russian 11 Jan 91 p 2

[N. Kozlova report] "Emergency at Chernobyl Nuclear Power Station"

[Text] It must be said that this isn't the first incident of the year. But whereas the incident a few days ago at the Balakovo Power Station was just a pile of rubbish which caught fire, what happened yesterday was a far more serious event.

This is how A. Kontsevoy, leader of the Ministry of Atomic Power Engineering and Industry Main accident coordination administration [Glavnoye avariyno-dispatcherskoye upravleniye] described it:

"The emergency happened on the morning of 10 January. The operators at the control panel of the Chernobyl Nuclear Electric Power Station number 3 power unit suddenly noticed figures flashing on the display panel: The power unit's output was dropping sharply. One of the main pumps cooling the reactor shut down. A cable compartment filled with smoke. At the same time the automatic fire extinguisher system went into operation. Damage to a cable, which was most probably the cause, has not been discovered yet. A commission is presently clarifying the circumstances of the incident.

Balakovo Nuclear Station Faults Threaten Volga

PM0301165791 Moscow *PRAVDA* in Russian 3 Jan 91 Second Edition p 3

[Interview in Balakovo, Saratov Oblast, with Doctor of Technical Sciences Professor A. Andryushchenko, by A. Vorotnikov; date not specified: "When You Live Next to an AES (Nuclear Power Station)... The AES Failed the Ecological Examination"]

[Text] Balakovo, Saratov Oblast—There is a lovely little village called Balakovo on the Volga which is covered with snow in winter and drenched in greenery in summer. Its inhabitants are chemists, machine-builders, river transport workers, and AES constructors. Nearby, eight km away near the village of Natalino, tower the AES buildings. Both the village and the AES have in recent years attracted increasing attention not just from physicists and power engineering specialists, but also representatives of various public organizations, and particularly the "greens."

"What is this all about?" I asked Doctor of Technical Sciences Professor A. Andryushchenko, one of the eminent scientists in Saratov, who chaired a seminar on nuclear power engineering just held in Balakovo. "Is there an undesirable ecological situation?"

"Yes," Anatoliy Ivanovich answered. "The total discharge of harmful substances into the atmosphere by various industrial enterprises in the city comes to 72,000 tonnes annually. This includes sulfurous compounds, ammonia, and hydrogen fluoride. They exceed the maximum permissible norms by between two and eleven times. The annual total of harmful waste is up to 360 kg for every inhabitant of Balakovo. That is why there are now more people suffering from diabetes, bronchial asthma, cancer, and diseases of the circulatory organs. A total of 82 percent of children have signs of various illnesses. Balakovo has the highest percentage of occupational poisoning in Saratov Oblast.

Despite this undesirable ecological situation and the burden of industrial installations on the area, the first stage of the Balakovo AES was designed and then built nearby in 1985.

[Vorotnikov] And that, I believe, violated a resolution.

[Andryushchenko] That is quite correct. The local AES was erected in contravention of USSR Council of Ministers and CPSU Central Committee Resolution 567, dated 18 July 1981, which was in force at that time. Under that resolution, new industrial construction and the extension of existing production facilities were prohibited in such places. The city's housing areas were squeezed between the AES site on the northeast side and the safety protection zones of the Minudobreniy and Khimvolokno Production Associations in the south.

[Vorotnikov] Anatoliy Ivanovich, has the Balakovo AES project passed the state environmental examination?

[Andryushchenko] That is the whole problem—so far it has not. Nevertheless, its construction has continued from year to year. During its use there have been frequent unplanned interruptions in the operation of the power units. In 1989 there were 30, and in 1990 rather fewer.

[Vorotnikov] Why does this happen?

[Andryushchenko] Primarily because sub-standard technological equipment breaks down, particularly the steam generators. For example, in the first power unit they worked for only five years instead of the 30 years they were guaranteed for.

[Vorotnikov] The cooling reservoir has also been causing a great deal of criticism....

[Andryushchenko] Exactly. It is part of the Volga reservoir, sealed off with a sand embankment which is very permeable. In the event of a serious accident this will create potential danger to the great river.

[Vorotnikov] And what is the personnel training situation?

[Andryushchenko] Unfortunately, because of a lack of modern training equipment, practices do not conform with world standards.

[Vorotnikov] Is there a system of economic and social protection for the population living in the area of this AES?

[Andryushchenko] No. Different options for predicting local, regional, and global damage to the environment and the population in the event of a serious accident have not been drawn up either. Nor are the inhabitants of Natalino village being granted privileged conditions for living there.

[Vorotnikov] What conclusion did the participants in your seminar reach?

[Andryushchenko] We decided to appeal to the USSR and Russian Soviet Federated Socialist Republic Supreme Soviets to speed up the adoption of a law on nuclear energy, governing the economic and legal aspects of regulating mutual relations between this sector and the population. The scientists recommended that the USSR Ministry of Atomic Power Engineering and Industry put the resources allocated for the construction of the second stage of the station into making sure that the power units in the first stage of the AES work more efficiently and reliably. Also that it ensure a stage by stage transition to a closed cooling system—through cooling towers—thus eliminating the danger of polluting the Volga from the cooling reservoir. Also, in the short term that a modern training system be used. All equipment provided for these stations must also be reliable. It is scandalous that steam generators break down five or six times more quickly than they should. And finally we determined the subject matter for joint scientific

research to improve the reliability and safety of AES's. We are involving scientists from the Volga region and the whole country in this.

Pyatigorsk Introduces 'Ecological' Toll Charges for Transit

PM0801135991 Moscow PRAVDA in Russian 7 Jan 91 Second Edition p 3

[Correspondent V. Pankratov report under the rubric: "Ticker Tape": "Ten Rubles for a Whim"]

[Text] Drivers of all types of motor vehicles passing in transit through Pyatigorsk must pay a 10-ruble toll. This decision has been adopted by a session of the city soviet. For those not wishing to burden themselves with an unnecessary expense, provision has been made for an alternative option associated with the use of the bypass: Travel along it is free. The purpose of the innovation is to ensure effective protection of the atmosphere. Routes from such directions as the Transcaucasus, the Volga region, and the Black Sea intersect in Pyatigorsk. It is planned to use the sums obtained from the tolls to implement measures to protect the environment. This is why they are called ecological dues. Ten rubles is the payment for a whim for those who do not wish to use the circular route.

Urals Town Contaminated by Radioactive Waste, To Be Evacuated

PM1401155391 Moscow IZVESTIYA in Russian 11 Jan 91 Union Edition p 5

[A Tarasov "Reportage With a Bias": "Evacuation 40 Years On"]

[Text] Sverdlovsk Oblast—A Sverdlovsk Oblast Soviet Executive Committee [Oblispolkom] resolution has been approved. It provides for the evacuation of the inhabitants of the settlement of Ozerney, Rezhnevskiy Rayon, which is 70 km from the oblast center—it is yet another radiation disaster zone.

On my way to Ozerney I took a look at the radiation monitoring report on homes in the settlement, drawn up by a team sent out by the oblast sanitary and epidemiological station. Here are a few entries: "25 West Street—ceiling around 1,000 microrentgens per hour; 8 West Street—800 microrentgens per hour in the stove"....

I entered this little house, all neat and tidy:

"Lady, do you know that your stove gives off 120 microrentgens per hour and the part of the fence near your neighbors' gate is giving off around 400?"

"They came from the city and gave my mother a dosimeter. They told her to hang it on a nail. A month later they collected it. But there has been no sign of them since.."

In my conversations with the villagers I established that most of them were not only ignorant of the changes that lay in store for them, but had no inkling of the nature and scale of the problem in their own homes. And that was despite the fact that it had been Ozernyy's lot to have radiation as a "neighbor" for as many as four decades—ever since construction began on the uranium-thorium ore enrichment combine alongside the settlement.

...The Rezhevskiy uranium deposits turned out to be poor, so in 1964 the nuclear people left, leaving thousands of cubic meters of raw material in "burial grounds." It was only a token burial—sprinkled with earth. Sprinkled indeed—the protective layer was barely one meter deep. There were towering piles of sand-clay refuse on the bank of the Ozernaya River—production waste, its high level of radioactivity due to the residual uranium and thorium.

The nuclear people upped and left, without even giving the inhabitants of Ozernyy a hint of the implications of their legacy. The villagers set about removing the abandoned sand-clay refuse—anyone building a brick house, plastering walls, building a sandpit for grandchildren. Construction organizations took the pesky sand away in trucks and put it on all the highways in the neighborhood. The radiation spread in patches.

In the late sixties the Sverdlovsk radio equipment plant, which was setting up a branch in the settlement, took over the empty premises of the former secret facility and the oblast sanitary and epidemiological station was allowed to monitor production.

"We appealed to the oblast leadership on several occasions," S. Treyger, a doctor at the oblast sanitary and epidemiological station radiation hygiene department, said. "But they merely made a note of our decontamination proposals."

Two years ago some unsuspecting construction workers uncovered one of the "burial grounds" while laying heating pipes. Ozernyy had begun the final act of a tragedy without ever suspecting it: Everyone was suddenly renting cottages for the summer, students from the Urals University "Vagant" detachment were building spacious brick houses in the settlement, and subsidiary farming was on the increase at the radio equipment plant.

V. Vyukova, head of the midwifery center:

"Recently I collected analyses of all the settlement's inhabitants. I was hoping that doctors would require them. But no doctors have come. Except for a stomatologist, who agreed only to do a stint here."

Conversations with the villagers revealed that R. Khuzin, chief physician at the Rezhevskaya sanitary and epidemiological station, did visit Ozernyy on several occasions, but an amazing silence accompanied the visits... One inevitably wonders whether the settlement's

plight is due not so much to the nuclear people's irresponsibility and not so much to the oblast authorities' diktat and local authorities' incompetence as to a basic lack of respect for the villagers, which condemned them to neglect and ignorance. After all, if Ozernyy had been just once told the truth about the burial places and the villagers had been taught how to take elementary precautions against the invisible calamity, would they have allowed their kids to create a beach on top of one of the "burial grounds," near the river, where the gamma radiation was calculated at 3,000 microroentgens per hour? Had the doctors seen the analyses of the settlement's inhabitants, would they be dismissing some of them now, at the mere mention of evacuation?

Talk about moving and people reply: "We would not be able to find work; we have cushy jobs here, salaries. But they also complain about not being able to lay on a decent meal and about sick children. The ultimate in the statization of human beings. To keep quiet about the fact that the settlement has been enveloped in something that is probably rather worse than a ring of radon clouds above the "burial grounds" is to make a mockery of things human: doctors maiming the sick through their inaction, the sick sacrificing their own salvation and their children for the sake of "salaries."

So they finally remembered Ozernyy. As if the 40 silent years had never happened and the tragedy had occurred overnight, the settlement suddenly—the only word to describe it—started getting visits from commissions, the Rezh Soviet adopted a resolution, immediately followed by the Sverdlovsk Oblispolkom. We might stop there. But one thing is worrying: Rezh and Sverdlovsk intend to help Ozernyy in different ways. For example, Rezh deputies, attracted by the possibility of rectifying matters at a chemical plant where, owing to conversion, there is a dire shortage of manpower, the Rezh deputies plan to construct 450 apartments and 25 cottages for the villagers. A Sverdlovsk Oblispolkom resolution talks only of 336 apartments in the rayon center—to all appearance, it will be implemented, nonetheless. A Rezh City Soviet decision envisages the construction of a kindergarten for children who have been moved out of Ozernyy, but this is not mentioned in the oblispolkom resolution.

There is no need to wonder why the Sverdlovsk people "forgot" about the kindergarten and 150 or so families of villagers. The reason is symptomatic. Judge for yourselves: The oblispolkom first calculated the cost of decontamination, involving the removal of radioactive waste from the settlement—and pretty expensive was the result. Evacuation, then. So they calculated what it would cost. Even more, apparently... A senior delegation went to Ozernyy, called a meeting of villagers, and tried to persuade them that there was no need to move.

What you have here is "market scales"—on one side the cost of the plans, on the other the value of the villagers' health.

The argument for those who stand behind the scales is that six-year-old Katya Kargina died in December in Ozerney. Of leukemia.

...Just before I left I dropped in at the settlement soviet. I was closely followed by little Katyusha's mother, who had come to arrange for a death certificate for her daughter. I dared not approach her, so I went out onto the street. I was presented with a spectacle typical of the times: children from a boarding school for the mentally retarded—constructed on the grand scale in Ozerney, with 150 places; incidentally there is no mention of its future in the oblsipolkom resolution—were running in the direction of a "burial ground," all red faces, shouting something. They were running along a snow-covered road, through patches of radiation.

Tyumen Oblast Residents Fear Falling Rocket Debris

PM0801090991 Moscow IZVESTIYA in Russian
7 Jan 91 Union Edition p 1

[SIBINFORM report: "Rockets Will Go on Falling"]

[Text] Colonel General of Aviation German Titov, the second man in space, has held talks with representatives of Soviet power in Tyumen. The subject of the talks was "Rocket Launcher Stages Falling on the Oblast's Territory," SIBINFORM reports.

"The Tyumen people are rightly concerned about rocket stages falling on their territory," German Titov said. "First of all, let me set people's minds at rest—our rockets are environmentally clean. Their fuel components are ordinary kerosene and oxygen."

That will not help local residents, who will still have to mind their heads...

Kazakh President Cited on Future Semipalatinsk Nuclear Tests

LD0101120791 Berlin ADN in German 1127 GMT
1 Jan 91

[Text] Moscow (ADN)—The Kazakhstan President Nursultan Nazarbayev fears "political and social repercussions" in his republic if Moscow continues with its nuclear tests on the Semipalatinsk test site. Nazarbayev told the Soviet news agency NOVOSTI [no date given] that all talks between the Kazakh leadership and the leaders of the Defense Ministry have so far remained unsuccessful. Everybody is sticking to his positions. Irrespective of the fact that Kazakhstan has strictly banned any further nuclear tests on its territory, it has recently emerged from the army leadership that a total of 18 underground nuclear explosions in Semipalatinsk have been planned for 1991 and 1992. The Kazakhstan president sees in the attitude of Defense Minister Yazov a sign of the "imperial policy of the center" which refuses to abandon the totalitarian system which exists in the USSR. "Obviously, the center has no idea of the real

situation which exists here," Nazarbayev said. "They should finally understand that there will be no turning back from sovereignty in the republics. Policies should be developed which are based on that premise."

Semipalatinsk Test Site Environment Study Planned

PM0801112191 Moscow KRASNAYA ZVEZDA
in Russian 4 Jan 91 First Edition p 1

[Report by Ye. Doroshenko: "Diagnosis for Test Range"]

[Text] A coordination conference of the country's scientific organizations which in 1991-1995 have to carry out a comprehensive study of the Semipalatinsk test range and adjacent regions was held recently at the V.G. Khlopin Radium Institute.

The program provides for a study of the full spectrum of possible radiation and ecological, medical and biological, and seismic consequences of nuclear explosions compared with the influence exerted on the environment and on man by natural factors and ecologically harmful technogenetic factors in modern production facilities.

The main avenues in the study will be headed by Doctors of Chemical Sciences A. Krivokhatskiy and Yu. Dubasov, Doctor of Medical Sciences V. Gorlov (USSR Health Ministry), and Doctor of Technical Sciences A. Matushchenko. It is planned that a number of Kazakhstan's scientific organizations will take part in the work.

The results of the research will be brought to the notice of the broad public.

Fifth Irkutsk Oblast City Declared 'Environmental Disaster Zone'

PM0701142791 Moscow IZVESTIYA in Russian
4 Jan 91 Union Edition p 2

[Item from roundup of IZVESTIYA, TASS, SIBINFORM reports: "Fifth Environmental Disaster Zone"]

[Text] A session of the Shelekhov City Soviet has adopted a decision to recognize the territory of the city of Shelekhov as an environmental disaster zone. According to the data of a commission, 52,000 tonnes of harmful substances are discharged annually into the atmosphere of this city of 50,000 people. Moreover, a check carried out on agricultural produce delivered to a store revealed twice the maximum allowed quantity of nitrates.

Shelekhov is the fifth city in Irkutsk Oblast to declare itself an environmental disaster zone.

Fines, Programs Aim To Curb Bratsk Pollution

PM0201095391 Moscow Television Service in Russian
0930 GMT 27 Dec 90

[From the "Vremya" newscast: Report by N. Vidonov, A. Kazakov, identified by caption]

[Text] [Vidonov] This clear, quiet backwater is all that remains of Vykhorevka, a once-clean northern stream. And this is what the Brattselyuloza Association has turned it into. [video shows effluent being discharged into river] Now fines have to be paid for such outrages. The association had to pay 20,000 rubles (R) as a fine for the last accidental discharge.

Viktor Aleksandrovich, how effective are the fines which you collect from enterprises that pollute the environment, and who benefits from this?

[V.A. Sukhikh, deputy chairman of the Bratsk Environmental Protection Committee] To date the Bratsk territorial committee has collected R2.5 million in fines. These fines are to be returned to the enterprises in question in the shape of targeted programs, new technology, and industrial effluent purification systems.

[Vidonov] Naturally, the fines serve to curb undisciplined behavior. But it would be naive, to say the least, to hope to improve the ecological situation in Bratsk through fines alone. The harmful effects of the city's 26 enterprises, including such giants as the aluminum plant and the timber-processing complex, are simply too great. Radical measures and a purposeful program are needed. Such a program does exist. But it is being implemented only with great difficulty. Nonetheless, the hygiene service has been able to prevent the commissioning of two large furnaces at the silicone plant. It has also been proposed to mothball five production units at the aluminum plant. However, so far this good proposal from the nature conservationists is still in the balance.

Naturally, all these enterprises cannot be closed down at once. And that is not the right way out anyway. There are other methods. We need cellulose, aluminum, and many of the other goods which are produced in Bratsk. However, they should not be produced at the expense of people, their health, and their environment. This must not be forgotten.

Bratsk Declared 'Ecological Disaster Zone'

LD0401124291 Moscow Domestic Service in Russian
1000 GMT 4 Jan 91

[Text] A group of deputies of the Russian Soviet Federated Socialist Republic Supreme Soviet Committee for Issues of Ecology and Rational Use of Resources has been working in Bratsk for three days. The deputies studied the situation at major enterprises in Bratsk, at the timber industry complex and the aluminum works, and had meetings with the public and local authorities.

As the result, about 50 measures have been planned to help Bratsk improve its ecology: declaring the city an ecological disaster zone, and the modernization and retooling for new production [pereprofilirovaniye] of a number of enterprises are among them. Bratsk residents were also presented with the USSR Council of Ministers' decision on the transfer of the Bratsk timber industry complex from Union control to Russian.

Ecology Problems Beset Lake Baykal Pulp and Paper Mill

PM1501142591 Moscow Central Television Vostok
Program and Orbita Networks in Russian 1530 GMT
12 Jan 91

[From the "Vremya" newscast: Report by N. Vidonov, identified by caption]

[Text] [Announcer] Under the program for the protection of Lake Baykal, pulp production should be ended at the Baykalsk Pulp and Paper Mill by 1993. It should be converted to environmentally clean production.

[Vidonov] [Video shows exterior, interior of plant] Day and night the pulp and paper mill pumps out fumes that are certainly not ozone. And although it discharges its waste through a unique purification installation, such close proximity is nonetheless harmful and dangerous for the health of Lake Baykal. That is why the correct choice was made to convert the mill and switch it to environmentally clean production. Several very varied options have already been suggested—a complete shutdown of pulp production, a partial shutdown, a reduction in output, a thoroughgoing renovation of the equipment, waste-free processing of the timber, furniture assembly, and production of consumer goods. The mill's collective and specialists together with the Sibgioprobum Institute have been putting forward their own conversion program. Offers have also come in from many foreign firms. The question now would seem to be choosing the ideal option. But no. None of them has received the ecological blessing of experts at the Russian Environmental Protection Committee. The mill's collective is currently experiencing hard times. It is not working at full capacity owing to a shortage of timber. Its coffers are not particularly full, and in terms of morale the pulp and paper workers do not feel very comfortable. Even though they are least to blame for the prevailing situation. [Video shows A.N. Babychenko, chairman of Baykalsk City Soviet, identified by caption]

Aleksandr Nikolayevich, conversion represents a new direction not only for the mill but for all the residents of Baykalsk.

[Babychenko] Undoubtedly. Both the mill and the city are currently in a very difficult situation. On the one hand, there is the 1987 resolution on the protection of Lake Baykal which orders the conversion of the mill. And, on the other hand, there has recently been a presidential decree stating that all enterprises should renew their existing contracts and conclude contracts.

What does this mean? It means that the mill should be working to full capacity, concluding contracts, and essentially being fully productive until 1993—the deadline for the its conversion. It should then shut down production and embark on conversion. You yourself know that this is simply unrealistic. That's why the oblast session has worked out a program for the mill's conversion which includes partial self-financing of the program, frees the mill from the burden of state orders, and freely licenses the use of any foreign exchange earnings. On the other hand, the ministry—the Ministry of the Timber Industry—and our Council of Ministers have to all intents and purposes been dodging the issue. This, of course, creates additional difficulties in this situation. Because, on the one hand, everyone's talking about protecting Lake Baykal, but when it comes to the specific implementation of the conversion program we're essentially left to get on with the problem ourselves.

Spanish Firm Aids Cleaner Aluminum Production in Lugansk

PM0201101991 Moscow Central Television First Program Network in Russian 0930 GMT 26 Dec 90

[From the "Vremya" newscast: Report by Ye. Bruk, identified by caption, from Lugansk Oblast]

[Text] [Announcer] The days of the old smelting furnaces at the aluminum alloy plant in Lugansk Oblast are

numbered. Next to the old furnaces new induction furnaces have been assembled which make it possible not only to considerably improve the quality of metal and build in strictly prescribed properties, but also to save electricity and—particularly important—greatly to improve the ecological situation, doing away with air and water pollution.

The plant is acquiring a clean "breath" as a result of cooperation with the Spanish REMETAL Corporation and the creation of "Intersplav," the sector's first Soviet-Spanish joint venture. The foreign partners drew up the reconstruction plans, supplied the most modern technology, and are delivering the best equipment available in the world today. A further advantage is that this technology and equipment make it possible to use non-ferrous metallurgy foundry slag as raw material. There are millions of tonnes of this material in slag heaps, which further pollute our country, already anything but clean.

A considerable portion of the wages of this enterprise, and as from next year the entire wages fund, will be covered by income from consumer goods production. And all the foreign currency earned as a result of the sale of above-plan main output abroad will be channeled into reconstruction and the development of the social sphere. This will enable "Intersplav" to fully retool the production facility by spring of next year.

REGIONAL AFFAIRS

Program for Forest Preservation Adopted

91WN0174A Paris LE MONDE in French 21 Dec 90
p 14

[Article by Roger Cans: "The Europeans at the Bedside of Their Sick Forest"]

[Text] Delegations from 31 European countries met in Strasbourg on Tuesday and Wednesday, 18-19 December, to adopt a program to save Europe's forests. From the Atlantic to the Ural Mountains, all research means are going to be pooled to protect the forests against their enemies, beginning with pollution and fire.

Europe is facing a paradoxical situation: its forested land is continuously expanding, because of the move away from farming, but the health of its forests is disturbing. Drought, freezes, storms, insects, diseases, fires, and acid rain have all taken turns attacking the trees of old Europe, which is at the head of a considerable wealth (175 million hectares, not including the USSR), but one which is fragile and at times unexploitable, like the Mediterranean scrub.

As regards the acid rain resulting from air pollution, everybody today knows about the most flagrant cases. In the Polish Sudety mountains and the Czechoslovakian Erzgebirge, thousands of hectares have been devastated by acidification. In Germany, forests are dying out in various parts of the Black Forest and in the Hartz and Baviere mountains. Even the Vosges or the Chartreuse in France have troubling areas where the forests are dying.

"It is useless to try to find out how many hectares have been destroyed or are being threatened," a Finnish professor of forest pathology explained. "We need to realize that every hectare of our forests suffers in one way or another, if only because of weather disturbances, pollution, and global warming."

Forty-Five Thousand Trees on Cards

But pollution is not the only problem. Last February during the storm that shook part of Europe, Germany lost 72 million cubic meters of woods. As for the Mediterranean countries, they were recently attacked by cochineal insects that killed the maritime pines over a large part of the coastline, and every year fires devour thousands of hectares. Even the cork oaks of Portugal are now the victims of a disease, like the chestnut trees of Cevennes.

The health of forest trees was not systematically monitored before 1979. In France, the DEFORPA (destruction of forests as a result of air pollution) research program was not initiated until 1984. As for the EEC's coordinated program, which establishes an inventory of forest damage in each of the twelve countries, it did not really get underway until 1987, with the establishment of

a card file on over 45,000 trees; this represents a systematic partitioning off of all the wooded massifs in the Community.

From observations made in 1989, it appears that less than 10 percent of the EEC's trees were regarded as damaged (losing over one-fourth of their foliage), as compared to 14 percent in 1987 and less than 10 percent in 1988. This means that damage, whatever its cause may be, is tending to level off and even appears reversible at times. In a report that will be published shortly by the EEC, the results are interpreted as follows: "For most species, no trend for the vitality of selected trees to improve or deteriorate was observed throughout the Community." Even in France, after 5 years of research, experts from the DEFORPA program were cautious: "There is currently no widespread destruction of forests, but there are various instances of destruction depending on the species and the region."

In fact, statistical research is so recent that nobody is capable at present of making a sure diagnosis, and a fortiori when an attempt is made to gather data covering all of Europe. What is there in common between the tundra of Lapland and the Corsican scrub, between the beech groves of Normandy and the Czechoslovakian mountains? Moreover, every country has its own way of evaluating and interpreting damage. "In seven years of observation, we have gone from a disaster scenario where all our forests would be dead to a sort of generalization of the malady" according to Paul Breloh, head of the German forest department.

Thus it was important to harmonize the observations and their interpretation throughout Europe. Louis Mermez, French agriculture minister and co-president of the conference, and Brice Lalonde, environment minister, during a brief visit to Strasbourg, were both able to realize how much European forest managers were looking forward to this meeting, the first of its kind. "There is a gap between scientific knowledge accumulated by specialists and people in charge of decisionmaking," a Finnish delegate observed. In an initial stage, the foresters are going to exchange their data and the research workers their results. Then the political decisions will come. The European forest, thousands of years old, cannot wait any longer.

The Six Resolutions

The delegates who met in Strasbourg adopted six resolutions designed to coordinate research:

1. A network of "permanent plots" (squares of forest in which a card is established for every tree) will be extended to cover all of Europe, to monitor the health of the forests according to common research protocols.
2. European foresters are urged to preserve the genetic stock of their trees, either on site or through appropriate silviculture activities, in the form of collections or reserves.

3. A European data bank will be created to gather together all the information on forest fires and their prevention.

4. A coordinated research program on mountain forests, either natural or protected, will be initiated.

5. The French-German Eurosilva network for studying the physiology of trees will be expanded to cover all of Europe.

6. Research institutes are invited to form a European network to study the operation of forest ecosystems.

Norwegian-French Gas Export, Policy Discussed

91WD0229A Oslo AFTENPOSTEN in Norwegian
7 Dec 90 p 7

[Article by Ole Mathismoen: "French-Norwegian Environment Offensive"]

[Text] "The Troll agreement on Norwegian gas exports to France is the most important environmental cooperation between the two countries up to now. This must now be expanded," Under Secretary Jens Stoltenberg said during a French-Norwegian environment symposium in Oslo yesterday.

Industrial representatives and researchers met to lay the groundwork for expanded environmental cooperation. No concrete projects were agreed upon yesterday, but individual companies in the two countries have several items on the way.

Stoltenberg pointed out what a good basis the Troll agreement is. Since the early 1970's, Norwegian gas has been the raw material for cleaner energy production. Cutting out coal and oil in favor of gas reduces carbon dioxide exhaust by 30-50 percent, Stoltenberg said. He stressed that nongovernment, private-firm environmental projects between Norwegian and French industry are highly desirable.

French Environmental Plan

During the conference, elements of the new French environmental plan were presented by the special counselor to the French cabinet minister for the environment, Lucien Chabason.

He said that the French Government is preparing a strong environmental offensive to come to grips with the country's worst problems. In particular, large sums will be earmarked for handling waste products from industry and from households. "As of next year a new waste tax will be introduced in an attempt to reduce the amount of waste and to obtain money for our newly planned environmental directorate, which will focus environmental research in the broadest meaning of the word: cleansing, new technology, and alternative production processes," Chabason said.

Chabason also said that preparations are being made to use economic means in other areas. "In particular, the use of environmental taxes is being considered to ensure better water supply and cleaner water. We also want to tackle our dramatically increasing traffic problem. The goal is to stabilize the situation by increasing use of railway freight, just as we have done for passenger traffic," he said.

Other elements in the French environmental plan, which is considered to be very radical in France, concern the improvement of environmental laws and a more effective follow-up by the police and the courts, as well as expanded democracy in environmental matters where nongovernment organizations and ordinary people will have increased influence. Old systems of taxes and fees that have a directly harmful effect on the environment will be eliminated. Among other things, the law on tax removal for property in which swampland is cleared will be rescinded. The law dates back to the past century when swampland meant the spread of disease among people and domestic animals. New tax rules will also be introduced. Among other things, thought is being given to open the way for heirs to avoid inheritance taxes if they leave property in special areas to the state.

FINLAND

Forest Acidification Advancing Rapidly

Largest Environment Study

90WN0285A Helsinki HELSINGIN SANOMAT
in Finnish 17 Aug 90 p D1

[Article by Johanna Mannila-Kaipainen: "HAPRO Issues Warnings to Emissions Violators; Dace and Lichen Diminish, Forestland Not Yet Ruined"]

[Text] On Thursday evening more than 200 environmental scientists drank a toast to the end of the acidification research project (HAPRO) at the cabinet festival hall in Helsinki. Some were sad, some were relieved, and some were furious at the end of funding.

After HAPRO, the researchers who participated can say with certainty that sulfur fallout generally exceeds the critical tolerance level almost everywhere in Finland. If fallout is not reduced, it will cause damage to forests and waterways.

As the project ends, the researchers unanimously recommend a speedy reduction in emissions both at home and abroad.

The changes due to acidification of Finland's countryside are seen most clearly in lichen growth and in the fauna, mostly fish and crayfish, of forest lakes.

The proportion of soil nutrients is also changing, and it threatens the growth and health of forests. However, forestland has not yet been ruined.

Acidification is due to the emission of sulfur dioxide and nitrogen oxides as well as to ammonia, hydrocarbons, heavy metals, and alkaline metals. As HAPRO ends, however, no one knows when the ecosystems already damaged will return to normal. The return may take 10 to 100 years.

Forests Suffer

Sulfur and nitrogen fallout first increases the growth of trees; the disadvantages are not seen until later.

An elevated amount of heavy metals was measured in moss and lichens 20 or so km south of known sources of effluents such as Tornio, Harjavalta, Siilinjärvi, and the Kola Peninsula.

Species of lichen have become extinct due to atmospheric contaminants, although the exact mechanism of killing is still unclear.

The premonitory symptoms caused by pollutants are evident everywhere in the trees: needle cast, yellowing of needle tips, changes in the fine structure of needles.

Atmospheric contaminants enfeeble the trees in many ways. Yet, according to what we know so far, atmospheric pollutants have only a secondary effect on the needle cast of trees. A tree's health depends primarily on age, atmospheric factors, and diseases that strike at random, such as pine shoot cancer.

Dace Population Suffers

There are about 5,000 acidic lakes in Finland. Most of the acidic lakes are small woodland ponds, but the acid tolerance of Pielinen, Keitele, Konnevesi, and Inarijärvi has also dropped.

Research biologists have been able to distinguish between acidophilic and acidophobic organisms.

Particularly sensitive to acid are, for example, dace and crayfish; fairly tolerant are pike and perch. Acid of atmospheric origin is estimated to have enfeebled the dace population of 780-1,560 lakes and destroyed that of 330-670 lakes. The perch population has been weakened in only 110-220 lakes and has vanished in 12-24.

Hazardous heavy metals appear in acidic bodies of water and easily make their way into fish. The mercury content of pike caught in acidic lakes comes close to making the fish unfit for human consumption.

Much Left Unstudied

In the opinion of HAPRO Director Pekka Kauppi, HAPRO leaves behind a lot of questions.

"Without doubt, Lapland was inadequately studied by HAPRO. I hope the situation will be corrected by research now under way."

The way trees grow also should have been studied more thoroughly, believes Kauppi. "Just that it costs an arm and a leg."

Charting and defining the critical tolerance limit was left to the last minute, and more work will have to be done on it.

If there is anything Kauppi would do differently, he would pay much more attention to the quality of measurements and the reliability of results.

"Our calculations are all in order, but the rest of the world invests a lot more energy in demonstrating the reliability of such research than we do."

The soil also received insufficient study, in Kauppi's opinion. "We learned too late about old soil samples at the Agricultural Research Center that we could have used as comparison material. Enough research has been done on changes that occur in soil."

Estimating Improvement

According to forecasts made by scientists, the acidification problem must be handled essentially by reducing emissions.

Yet even major restraints on the emission of sulfur and nitrogen oxides will not entirely halt the spread of acidification. Structural changes in energy and transportation systems are also needed. And consideration should be given to reducing ammoniac emissions.

Current regulations limiting sulfur emissions cost 400-600 million markkas a year. The outlay for so-called tighter constraints would be 800 million to 1.2 billion markkas.

Limiting nitrogen oxides would cost 2.6 billion markkas if the goal was to reach a level lower than 15 percent of the emissions of the 1980's before the turn of the century.

Limiting the emission of sulfur and nitrogen oxides would cost 700 markkas a year per inhabitant. At the same time, restricting the emissions of transport vehicles would decrease the amount of hydrocarbons and carbon monoxide.

Enormous Five-Year Work

HAPRO was Finland's first environmental research megaproject.

Seven universities and eight state research facilities participated in HAPRO. The job lasted a solid five years, and more than 200 researchers took part. The project consumed 50 million markkas of the state budget from 1985 to 1990.

The most important income of the project may be the 1,237-page "Acidification in Finland," which was issued during the summer by a prestigious German publisher.

An 89-page summary of the conclusions in "Acidification in Finland" can be obtained from the State Printing Office.

Answers Given by HAPRO

The tasks of the acidification study were defined five years ago. The study was supposed to answer four questions.

- How widespread are the regional effects of hazardous atmospheric contaminants in Finland?

The areas where forests have died are very small. In general, forest soil is not so contaminated as to essentially enfeeble the stock timber.

Clear changes due to acidification have been observed in fish populations, but the fish have been wiped out in 20 or so lakes at most. The damage has not been as serious as in many other countries.

However, many different effects of acidification were observed in forest vegetation and aquatic organisms everywhere in the country except in western Lapland.

- Is the damage spreading?

The damage and the danger are spreading. Sulfur fallout continues to acidify soil and water, even though emissions have been reduced from their peak values.

Nitrogen fallout has caused little damage so far, but it has contributed to the eutrophication of lakes and made it harder for various plant species of rugged forests to survive.

Forests are now binding nitrogen efficiently, but the situation may change in the future such that nitrates start to flow into bodies of water. Even now, this danger is acute in connection with logging operations.

- Which spots are especially threatened?

Especially threatened spots are forest lakes, vegetation of rugged woods, and organisms in headwaters of streams. Of all the forest plants, epiphytes such as beard and horsehair lichen that grow on tree surfaces are in the greatest danger. They have suffered considerably from atmospheric impurities, and some have even become extinct.

Acidification represents a danger everywhere in South Finland, from the shore of the Gulf of Finland to the latitude of Oulu, as well as in eastern Lapland.

The especially threatened spots are distributed evenly and randomly over this entire area.

Acidification may have retarded the growth of pine stands in South Finland. In general, the growth of forests has been very favorable for reasons independent of atmospheric pollutants.

- Which measures would reduce the deleterious effects of atmospheric pollutants most cheaply and efficiently?

We are now liming the lakes and fertilizing the forests, and the expenses are not great compared to the cost of reducing emissions. There are side effects, however. Splitting the expenses among the parties concerned may be cumbersome.

Emissions can be reduced by several methods, some fast-acting and some slow-acting. It is relatively fast and easy to install catalytic converters in cars and to rid smokestacks of sulfur.

It is most beneficial, however, if emissions are reduced in connection with the overhaul of industrial plants and energy-production facilities.

In the long run, the structural change of industry and energy production may serve to reduce emissions.

When will the damaged ecosystems return to the way they were before?

HAPRO was not asked that question, so the researchers did not answer it.

Paper Views Situation

90WN0285B Helsinki HELSINGIN SANOMAT
in Finnish 20 Aug 90 p 2

[Editorial: "Drawing the Right Conclusions From HAPRO"]

[Text] Basic things that were the subject of guesswork and the significance of which was bitterly disputed just five years ago are now known for certain about the state of Finland's forests. The results of Finland's first major environmental study, the acidification research project called HAPRO, confirm that sulfur fallout exceeds environmental tolerance throughout nearly the entire country. Forestland is not yet universally damaged, but the unfavorable trend continues despite current limits on emissions.

Most of the research has been published separately during the five years of the study. A synopsis now makes available to interested and accountable parties the results of teamwork by seven universities and eight research facilities. Printed for specialists was a 1,200-page account of the project called "Acidification in Finland."

According to HAPRO's final summary, timber reserves have increased on the average, and moribund forests are limited to small areas. Fewer than 1,000 hectares of standing crop have been entirely destroyed. If you want to belittle the effects of pollution and be lulled into carelessness, you can glean from this publication items to confirm your belief. Acquainting yourself more thoroughly with the results and opinions of some two dozen researchers, you note that, for the most part, no troublesome truths are revealed.

Sulfur fallout damages our countryside the same way it does in Central Europe, and acid rain affects earth, air, and water all at once. The researchers' interpretations are confusing for the layman to read. Pollutants are said to have a secondary effect because they do not necessarily turn up in the most contaminated areas. It will soon be reported that forests in nutrient-rich soil tolerate harmful substances better than forests in barren soil.

Researchers are happy to note that, so far, the vegetation has been able to take root by using the nitrogen fallout. The result has not been a flow of nitrates into lakes. It remains to be seen, for example, how soon the soil exposed by cutting down trees discharges such nitrates. Little mention is made of nitrogen's role in generating poisonous ozone or its tendency to increase the number of noxious insects. It seems inadequate to call the loss or extinction of some lichens and the complete fishkill of certain lakes just the premonitory symptoms of acidification.

This disjointed report does not make it sufficiently clear what happens when the soil and water become steadily more acidic. Alongside good timber output, the high mercury content of pike or the widespread destruction of dace may seem insignificant, and their casual connection is not obvious. It is unnecessary to foster a feeling of hopelessness, but it is irresponsible to draw overoptimistic conclusions that will not serve as a basis for defense if the study's gloomiest details escape the attention of analysts.

The beneficial application of lime and manure may, despite drawbacks, serve as a makeshift aid but cannot replace an expensive and tougher clampdown on emissions. In the end, HAPRO researchers recommend a reduction in both domestic and foreign fallout. Something must also be done about ammonia emissions, which have received less attention up until now.

Even though the five-year HAPRO project, which cost 50 million markkas, is finished, research must not come to a halt. We cannot afford to let experience accrued in the project go unexploited when many vital questions are still unanswered.

Separate Study Commences

90W N0285C Helsinki HELSINGIN SANOMAT
in Finnish 29 Aug 90 p 6

[Unattributed article: "Research Begins on Effect of Kola Peninsula Pollutants on Trees in Salla"]

[Text] Oulu—Helsinki University is beginning photosynthesis studies at the Varrio Research Station in Salla. Researchers are measuring the effect of ozone and Kola Peninsula sulfur emissions on the ability of spruce to assimilate nutrients. It is still unknown to what degree the plants' important assimilation activity is disturbed.

Sensitive instruments costing roughly a million markkas are placed practically on a mountain crest in the outermost region, where spruce appear. Varrio is located 20 km north of the section of Salla, where forest has been damaged.

Placed in the tops of spruce are six cylinders whose covers shut at even intervals for 60 seconds. The water and carbon dioxide content of the closed cylinder is measured by a gas analyzer that is located close to the research site. The readings are filed into the memory of a microcomputer. The cylinder has a volume of two liters.

"The cylinder's water and carbon dioxide content changes as the plant uses up carbon. If, for example, the plant is unable to use carbon because of sulfur dioxide, this is seen immediately in the measurement result when the activity of the cell chloroplasts is disturbed," says Professor Pertti Hari of Helsinki University's Silviculture Institute.

"The instrument is so sensitive that it responds if 5 percent of the plant's stomata are closed or if 5 percent of chloroplast activity is disturbed," says Hari.

With the help of sunlight, green plants manufacture carbohydrates from water and carbon dioxide. Carbohydrates—and the fats and proteins derived from them—serve as food for the plants.

Models with which to gauge the ongoing damage to eastern Lapland's forests are built on the basis of research. This research also complements the project begun last year on damage to forests in eastern Lapland.

"Our country's best scientists will uncover during the five-year project the reasons for damage to Lapland's forests, and will forecast the health of forests and the development of tree growth," says Martti Varmola, director of the Forest Research Institute's research station in Rovaniemi.

Helsinki University's Varrio Research Station is on its way to becoming one of the most important points for pollution measurement in Lapland.

The Meteorological Institute's pollutant measurement station was opened at Varrio in December. Devices for measuring radiation will soon be brought to Varrio. It is also Varrio's turn to get photosynthesis equipment sometime this winter.

"There is good background information about the Varrio countryside before the year 1973, when sulfur-rich ore began to be produced on the Kola Peninsula. The increase in pollutants is also seen in the fauna. A high content of nickel has been found in gray-sided moles, and a high content of cadmium in rabbits of eastern Lapland," says Varrio station director Erkki Pulliainen, an Oulu University professor and a Helsinki University docent.

"In follow-up studies, we would like to make clear how much heavy metal and sulfur/nitrogen oxides the trees absorb directly from the air," says Hari.

FRANCE

Lalonde's Plan on Environment Outlined

91WN0178A Paris LE QUOTIDIEN DE PARIS
in French 20 Dec 90 p 7

[Article: "Lalonde: My Green Plan, or Else..."—first paragraph is LE QUOTIDIEN DE PARIS introduction]

[Excerpts] The environmental minister Brice Lalonde presented a national environmental plan to the cabinet yesterday, intended, according to him, to "preserve the quality of life" and "reconcile protection of the environment with economic development."

Mr. Lalonde, whose message was transmitted to the press by government spokesman Louis Le Penec, announced that a series of bills would be submitted to Parliament in 1991. They will deal in particular with water, limiting noise around airports, urbanism, sites, and landscape.

Also in 1991, a "specific mechanism for financing the revival of a waste policy" will be established on the basis of the "polluter pays" principle; it will take into account the powers of local collectivities. [passage omitted]

Resignation in the Balance

The plan's goals, stressed the minister, fall into four categories: international cooperation, pollution and risks, protection of nature and management of natural areas, and urban environment. The plan also provides for a reform of public organizations: It creates the Environment and Energy-Control Agency (AEME) and regional environmental directorates, which will come into existence in 1991.

The government intends to involve all partners concerned in its policy, through an interministerial environmental committee and a national environmental college.

One of the priorities of the national environmental plan, the tax on waste, was adopted with some difficulty. This new fee for dumping waste should bring in about 400 million francs [Fr], which will be used to promote and set up more modern disposal techniques.

Fifteen Years Behind

Michel Rocard's arbitration in favor of the environmental minister Brice Lalonde's proposal was only obtained at the very last minute. Faced with the Finance Ministry's opposition to the creation of "an additional local tax", Mr. Lalonde went so far as to threaten resignation.

Final decision has not been reached on who will manage the new tax, which should come to an average of Fr20 a

metric ton of deposited household or industrial waste. The environmental minister had hoped that the total sum (the Fr400 million) would be managed by the new Environmental Agency that will be formed. In fact, it seems the waste tax will also be managed by local collectivities. Presented in June, Brice Lalonde's green plan, which sets the overall direction of the nation's environmental policy for 10 years, was then discussed in Parliament.

The French are thus being asked to invest an estimated additional Fr30 billion between now and 1995 in an area that "is 15 years behind". Brice Lalonde, known to have the prime minister's support, is doggedly carrying out the important organizational and financial reform of a small ministry which, given the ecological crisis, must now take priority. This is recognized by the entire political class. In just a few months, Mr Lalonde has been named a full minister, has seen a spectacular 48-percent increase in his budget (through transfers of personnel to his management) and, above all, has succeeded in creating general environmental directorates despite the "organizations war."

Finally, Mr. Lalonde got passed his bills for a large environmental agency and two research organizations: INERIS [expansion unknown] and the French Environmental Institute. The waste tax, intended to have a dissuasive effect and to prevent anything but "the waste of waste" from going into dumps, will inevitably be paid for by households and companies. It affects the 20 million metric tons of rubbish still deposited each year in waste sites, 9 million tons of which constitutes half of all household garbage. Forty percent of the latter is incinerated and 10 percent is made into compost.

The 6,000 sore spots represented by the "illegal" communal dumps such as the one in Marseille, and which take in about 500,000 metric tons/year of household garbage, are obviously not affected by the new tax. "We don't want to take any chance of making them official. On the contrary, we must keep any means we have of eliminating this outmoded process," say officials at the Ministry of the Environment.

Report Published on Nuclear Waste Sites

91WN0171A Paris LE MONDE in French 14 Dec 90
p 15

[Article by Roger Cans: "Parliamentary Report Challenges Choice of Nuclear Waste Storage Sites"]

[Text] Transparency, reform of the legislation governing ANDRA (National Agency for Radioactive Waste Management), and a reopening of the decision on waste storage sites: These were the main recommendations of a report made public on Wednesday 12 December by Mr. Christian Bataille, PS [Socialist Party] deputy from Nord, on "management of highly radioactive waste." The report was prepared for the parliamentary office of evaluation of scientific and technological decisions.

Start over from the beginning: That was the basic message of Mr. Bataille's report. Last February, after the government decided to suspend its search for nuclear waste burial sites, it was parliament's turn to address the haunting and explosive question of what to do with the irradiated fuels produced by nuclear power plants.

Deputies and senators agree on one point: Nuclear waste management got off to a poor start in France. In 1979 responsibilities in this domain were given to ANDRA—an agency completely under the control of the Atomic Energy Commission (CEA) and its subsidiary, General Nuclear Materials Company (COGEMA)—which made decisions behind closed doors and kept the public ignorant of its activities. "We must put an end to the cult of secrecy and authoritarian, bureaucratic methods," says the deputy from Nord in his report.

To achieve full transparency, the rapporteur proposes a parliamentary debate on the issue next spring. Deputies and senators would be asked to pass a new law on management of long-lived nuclear waste, after laying out all the facts gleaned over the last decade.

In the first place, Mr. Bataille calls for a reconsideration of the 28 geologic sites itemized (quite secretly) by ANDRA in 1983—not just the four sites picked in 1987 by Industry Minister Alain Madelin. Research laboratories should be built on "at least two" of these 28 possible disposal sites to determine the behavior of radioactive products buried at great depths (cost per unit: 2 billion francs [Fr]).

Why two? For scientific reasons, certainly, but also because the designation of just one site might mean that the laboratory would be converted eventually into a storage center, which could make it the focus of hostility from the local community. The rapporteur believes two of the four sites designated in 1987—Neuvy-Bouin (Deux Sevres) and Bourg-d'Ire (Maine-et-Loire)—have already been compromised by past blunders. He would prefer to "reopen the bidding," with the understanding that future decisions would be made in accordance with specific legislative injunctions.

During the first 10 years, the two sites chosen would be used exclusively for research purposes. Then a "national evaluation commission," totally independent from the nuclear industry, would make its storage site recommendations. Mr. Bataille considers underground storage a necessity, at least until research on advanced reprocessing and "transmutation" (decay of transuranic elements) is completed.

Mr. Bataille proposes to restructure ANDRA "to cut the umbilical cord to the CEA." The restructuring would also provide an opportunity to change the agency's name—mere mention of which excites hostility—and endow it with an independent scientific council. He also suggests that the future storage site should have legal status comparable to that of a nuclear power station. It could then be designated a "major building site" during construction (which is expected to cost Fr10 billion!),

and community governments in the area would be eligible for fiscal compensation (about Fr150 million per year in royalties). A local information commission, provided with appropriate operating funds, could also monitor activities at the storage center.

Nuclear Plant 'Sabotage' Arouses Concern

91WN0177A Paris LIBERATION in French 24 Dec 90
p 15

[Article by Gilbert Laval: "An EDF Tower Dynamited on Periphery of Golfech Site"—first paragraph is LIBERATION introduction]

[Text] The Golfech nuclear plant has been shut down for 15 days following the explosion that destroyed an electrical tower Saturday, but did not threaten the safety of the installations. No one has yet claimed responsibility for the sabotage, perpetrated by "knowledgeable parties" according to plant officials.

The news broke at 0030 hours Saturday: A fifty-ton steel electrical tower had just collapsed after an explosive blast, causing the immediate shut-down, with no other damage, of the EDF Golfech nuclear plant installations, in Tarn-et-Garonne.

"It will take at least 15 days to replace the tower and start up the plant again," says one of agents at the information desk.

Already last 13 June, when the date to commence operation of the plant was imminent, 27 explosive charges damaged two gates in the Malause dam and delayed the plant's start. Next, EDF (Electricity of France) had to treat the bad case of hiccups affecting the cooling system. Between technical incidents and the malice of those the EDF again called "saboteurs" yesterday, full industrial operation of the first of Golfech's two sections had to be postponed until last 1 November. Responsibility for the Malause attack had quickly and boldly been claimed in Valence d'Agen by the "joyful Gaul of Espalais": "Better a little stink in the water," said an anonymous voice on the telephone, "than cesium in the prunes." No call has yet been received about the tower. But plant managers already ascribe it to "people who knew what they were doing." The base of the 40-meter-high mountain of steel had already had its bolts removed, so as to split in two with the blast. There are 10 towers running from the plant's transformer exit to the distribution station. The first is right where the plant is. The second is on the other side of La Garonne, outside the protected perimeter. It is that tower that today is lying on the ground. With bravado, the "saboteurs" chose to come right up to where security provisions begin. This apparent determination obviously worries EDF, which has nonetheless announced that "the safety of the installations has not been called into question" by the latest attack.

New security measures may be extended to the outskirts of the site. "But problems are never definitively ruled

out," sighed an EDF engineer Saturday. More or less strong opposition has been manifested constantly against this plant on the banks of the Garonne. Besides the occasional vague bomb warnings and the escalation of cool-down tours by ecologist mountain climbers, officials still remember the sign: "If Chernobyl made you laugh, don't miss Golfech!"

Waste Disposal Problems Cause Alarm

91WN0144A Paris LES ECHOS in French 22 Nov 90
p 8

[Article by special correspondent in Lyons Philippe Escande: "Environment: Professionals Sound Alarm; France No Longer Knows Where To Dispose of Its Waste"]

[Text] To avoid "waste tourism," we must absolutely create new waste treatment and dump sites. But no one is willing to accept them any more. One solution under consideration: a deterrent tax.

In less than three years the Paris region will not have any more dump sites in which to bury its household waste. Philippe Brongniart, president-chief executive officer of SITA [not further identified] and the new president of the National Federation for Waste Activities and the Environment (FNADE, with a sales volume of 12 billion [currency unspecified] a year), took advantage of the POLLUTEC [not further identified] exhibition to sound the alarm. In cities like Rouen, Nimes, or Montpellier, the situation is downright critical. All the more so since the total volume of waste products is increasing by 1 percent per year there, and by 2 percent in Paris. Trucks sometimes have to go more than 100 km before finding someplace that will accept their loads.

As far as industrial waste is concerned, which has to be stored at special dump sites (referred to as class 1), it often has to be hauled for more than 500 km. Rhone-Alpes, France's second largest industrial region, which produces nearly 90,000 tons of waste a year, has had no more class 1 dump sites since the one at Montchanin was closed. As a result, all of its waste is shipped to the [department of] Doubs or near Sete. The west and the southwest have the same problem.

Minister of Environment Brice Lalonde has stated that he opposes any kind of what he calls "waste tourism." Nevertheless, this is the situation we are readying ourselves for. In the United States, some garbage trucks go as far as 2,000 km to get rid of their refuse. "Trucks haul fruit and vegetables from Ohio to New York and leave the latter filled with waste," Philippe Brongniart told us.

Six Thousand Illegal Dumps

Behind the shortage that looms before us today, we find the two phenomena that plague the waste manager: The NIMBY (not in my back yard) syndrome—in other words, "none of that near me," and the just as typical, NIMEY (not in my election year), which precludes any

discussion with a local elected representative who is nearing renewal of his term in office.

To lessen the volume of waste dumped "in a hole," and to therefore render the alternative solutions of recycling or incineration more competitive, the government is soon going to institute a tax on dumping (LES ECHOS, 16 October). This could be in excess of Fr30 per ton, and it could produce nearly Fr500 million in revenue the first year. "We're in favor of this measure just as we are of any measure aimed at better control over our waste," Philippe Brongniart emphasized, "but we must watch out for negative effects."

Among these are the temptation to strengthen an administrative organization to the detriment of immediate action and inciting to "waste fraud." The latter, as far as the mayor is concerned, consists of choosing the course of illegality by unobtrusively opening his land to completely uncontrolled and untaxed illegal dumping. There are already over 6,000 operating under these circumstances in France.

In prospect are new frictions between prefects and elected representatives. Hence FNADE's plea for "a strong, modern waste management policy."

GERMANY

Water Treatment Plants Needed To Save Elbe

91WN0166A Frankfurt/Main FRANKFURTER
RUNDSCHAU in German 15 Nov 90 p 33

[Article by FRANKFURTER RUNDSCHAU editorial staff member Christian M. Schoene: "Dresden's Drinking Water Unfit for Young Children"]

[Text] Frankfurt/Main, 14 November—The Elbe, probably the most extensively polluted river in Europe today, can be helped, though extraordinarily great financial resources must be applied and—just as important—the relevant know-how. This view is held by the German Association for Water Management and Land Use [DVWK]. It is stated in a report on the current condition of the Elbe and the problems associated with it that approximately 6 to 7 billion German marks [DM] will have to be raised just for investments in the case of certain large-scale waste water dischargers—for example the Buna and Leuna Chemical Works, the factories in Bitterfelde, and the cities of Boehlen, Pisteritz, Leipzig, and Dresden—if remedial action is to be taken. The Federal Ministry for the Environment recently declared at a DVWK meeting focusing on the subject of the Elbe that the construction of at least 35 treatment installations was necessary in order to reduce the pollutant content of Elbe River water to 25 percent of its current amount.

The DVWK, a technical and scientific association to which water management administration authorities and university institutes as well as engineering consultant

offices belong, and among whose principal functions is the formulation of technical regulations for water management, emphatically stresses the urgency of an—if possible, international—water quality monitoring effort for the Elbe. Such monitoring is necessary in order to gather basic data for water management purposes, to keep track of the effects of water quality maintenance measures, to alert water users in the case of accidents, and to monitor selected instances of discharging. As a result of the most recent political changes, the possibility now exists of establishing a water monitoring system which also includes the territory of the CSFR, where a considerable amount of the pollutants enter the Elbe but where requisite modern waste water treatment installations are completely lacking.

The example of Dresden illustrates the extent of the problems. Each day about 180,000 cubic meters of waste water is emptied into the river—in an almost untreated state—by this city of over 500,000 inhabitants and many industrial enterprises. The completely antiquated sewerage system cannot even come close to handling this amount. About one-tenth of the water percolates into the ground and endangers the ground water. Drinking water has not been able to be used for the preparation of food for small children for a long time because it is too heavily tainted with pollutants. Conditions are similar in the cities situated downstream—Radebeul, Coswig, Meissen, and Riesa.

In the case of Dresden, its partner city Hamburg early on made an effort to render "first aid." As early as November 1989 an agreement was reached in this regard. An important part of this project is the sewer system itself, the condition of which Heinz Davidsohn of the Hansa City's environmental agency compares with a "very sclerotic blood circulatory system": The internal diameters of the pipes have narrowed to such an extent that the flow and discharge of the water has been considerably reduced and the holding capacity has correspondingly decreased. The interiors of the pipes are now being freed of deposits through the use of special equipment that Hamburg is providing.

Chamber filter presses, which could only be obtained in the West for hard currency, have long been lacking at the Dresden Kaditz treatment plant. The resources for them were not allocated in the former GDR, and the treatment plant was shut down for all practical purposes. Remedial action could only be taken with assistance from Hamburg. Meanwhile, the plant is being modernized.

Hamburg is also working within the framework of the project on the rehabilitation of a galvanic industrial operation—and "indirect discharger"—whose especially problematical waste water winds up in the Elbe by way of the sewer system. Meanwhile, the partner city is also concerning itself with the complex of problems connected with drinking water in Dresden. Hamburg's help for the capital of Saxony in this area has already cost it well over DM3 million.

As the DVWK reports, there already is reason to be hopeful about the Elbe. Following the reduction of pollutant discharging in the territory of the former GDR, water quality has improved up to that portion of the river subject to tidal influences—the tidal Elbe between Geesthacht and Cuxhaven—and the Magdeburg Water Management Board is reporting a discernible increase in the oxygen content of Elbe water in comparison to previous years. This is being attributed to the temporary complete shutdown of the pulp mills in Coswig and Pirna.

Drinking Water Supply Problems Highlighted

91GE0111A Berlin WOCHENBERICHT-DIW
in German 29 Nov 90 pp 674-77

[Unattributed article: "Drinking Water Supply in Western and Eastern Germany"]

[Text] Because of more favorable climatic and geological conditions, the natural supply of available water per inhabitant in western Germany is nearly double that of the new federal laender. While western Germany's drinking water supply is based primarily on groundwater and spring water, a considerable amount of water from dams is used in eastern Germany.

In both parts of the country, water consumption has developed similarly in the past, albeit at a different level. A reduction in consumption by industrial sectors has been contrasted with an increase in demand by private households. Nevertheless, the increased consumption witnessed during the 1980's has clearly fallen off here. In the future, the rise in consumption in both parts of the country will probably be limited. Although drinking water supply problems are not expected in terms of quantity, the heavy strains on the environment mean that unless corresponding countermeasures are taken, significant quality problems must be reckoned with. These problems are especially grave in the eastern federal laender, and are in urgent need of a solution.

Water Supply and Consumption in Western Germany

Aside from local difficulties during periods of extreme heat, the water supply in western Germany presents no special problems in purely quantitative terms. The favorable hydrological conditions constitute one significant reason for this. The average annual precipitation is 837 mm/square meter [m^2]; of the total of around 208 billion [m^3], 129 billion m^3 evaporate, so that without outside inflow, 79 billion m^3 flow off via rivers or contribute to the replenishment of the groundwater. Including the amount of inflowing water above and below the ground, western Germany has 161 billion m^3 at its disposal each year.¹ Related to the number of inhabitants, this means a natural water supply of 2,720 m^3 .

Of this amount of water, a good one-quarter (44.6 billion m^3) is currently used each year. For the most part, this involves surface water from rivers and lakes, which is taken primarily for cooling purposes at thermal electric

stations and in industry. Groundwater and spring water, of which approximately 6.3 billion m^3 is procured each year—which corresponds to 14 percent of the total demand—are used mostly for the drinking water supply. Only 2 percent (0.9 billion m^3) of the demand for water comes from coastal filtrate. Of this amount, two-thirds is used to supply the processing industry and one-third is used for the drinking water supply.²

The public drinking water supply in western Germany is based predominantly on groundwater and spring water. Together with enriched groundwater, they accounted for approximately 82 percent of the total water volume of 4.2 billion m^3 . Water from rivers, lakes, and dams accounted for approximately 11 percent, and coastal filtrate for just under 7 percent.

The current structure of water procurement took shape at the end of the 1970's and since then has remained essentially stable. Clear shifts towards extracting groundwater have been observed. A decline has been noted most of all in the amount of water procured from coastal filtrate and enriched groundwater. One cause could be the lowered quality of surface water. In this procurement technique, the water is pumped from wells located in the vicinity of bodies of water or specially laid out seepage basins that are fed by sources of flowing water.

Water consumption from the public supply networks has increased only slightly in western Germany in recent years. While the amount of water supplied to consumers rose during the 1970's at an annual average rate of 14 percent, the increase from 1980 to 1989 was 0.3 percent. Of critical importance here is the fact that the amount of water supplied to industry continued to drop and that the consumption level of households and small business rose at a slower pace—after an average of 3.3 percent during the 1970's only 0.8 percent in the mid-1980's. The water consumption of other users (e.g., public facilities and government agencies) was practically unchanged during the 1980's.

The decline in industry is primarily due to the introduction of water-saving technologies. In the household sector, it is probably first and foremost saturation tendencies in equipping housing with sanitary equipment that are critical. In addition, the past few years in particular have seen an increase in the availability of water-saving appliances (dishwashers, washing machines, toilet flushing systems, etc.), the use of which is increasingly influencing consumption. This is also reflected in the trend in water consumption per inhabitant per day: While this figure was 118 liters back in 1970, an increase to 140 liters was observed by the beginning of the 1980's. Since the mid-1980's per capita consumption has remained virtually unchanged, in the range between 144 and 146 liters.

On the whole, the percentage of water taken from the public network by households and small business has increased, from just under 60 percent in 1970 to around three-quarters in 1989. In contrast, industry's share

during the same period decreased from around one-third to something less than one-fifth.

Based on demographic factors alone, a medium-term increase in the demand for drinking water can be reckoned with for western Germany. According to DIW [German Institute for Economic Research] estimates, the population could increase from just under 63 million at the end of 1989 to 65 or 66 million inhabitants in the year 2000.³ However, the further spread of water-saving techniques could counteract the resulting increase in consumption. Because there are also no consumption-increasing impulses discernible in industry and other consumers based on the experiences of the 1980's, there could at best be a slight overall increase. Quantitative problems in meeting water consumption levels are expected if the EC drinking water guideline is put into effect.

Development in Eastern Germany

Because of natural circumstances, the preconditions for water supply in eastern Germany are more unfavorable than in western Germany. In the five new federal laender, the average annual precipitation is only 662 mm/m^2 . Taking into account evaporation and outside inflow, the natural annual volume of available water can be estimated as 27.2 billion m^3 . A good 30 percent of this potential is used. There is 1,470 m^3 available per inhabitant per year—thus, around 45 percent less than in western Germany.

This comparison shows that based solely on natural circumstances, water in eastern Germany is a relatively scarce resource. In addition, a large part of the water supply depends on the amount of water that is stored in dams. For this reason, the amount of water available is very much influenced by the annual precipitation, so that during lengthy droughts severe disruptions in the supply can occur.

One of the consequences of this is that an attempt has been made in industry to intensify utilization through multiple circulation systems, in order to thus lower consumption. These efforts appear to have been successful, because from 1970 to 1988 industry's own water procurement has declined by an annual average of one percent, and industrial water use by 0.7 percent. In contrast, the massive increase in water consumption in agriculture is striking: an annual rise of 4.2 percent during the same period. The reasons for this must be sought primarily in the significant expansion of intensively irrigated outdoor cultivation.

On the whole, water use in eastern Germany from 1970 to 1988 increased by an annual average of 0.7 percent. The most important consumption sector throughout has been industry, which still accounted for nearly 60 percent in 1988 (1970: 74 percent). Nevertheless, agriculture in 1988 accounted for around one-quarter of total water use; compared to 1970, this signifies nearly a doubling in that sector's share of consumption.

Private households and "social facilities" (e.g., health and social service facilities, hotels, bars, and restaurants) accounted for only 14 percent of total water consumption in eastern Germany during the 1980's. However, with 1.1 billion m³, corresponding to approximately 75 percent, they are the largest consumers of drinking water. Per inhabitant per year, this corresponds to the consumption of approximately 186 liters. Other figures relate to the "procurement" of drinking water, which is just under twice as high per inhabitant as in western Germany. Because of the different statistical delimitations and significant fluctuations in data compared to western Germany, it can be assumed that the comparable average consumption level is around 140 liters. It can be expected that due to modernization in buildings, new construction, and an increase in water-consuming appliances in households, this consumption level will increase slightly in the medium term. Here as well, however, it makes a significant difference that primarily modern, generally water-saving equipment is being purchased, including where equipment is being replaced.

Prospects

Water is used in many ways in both parts of Germany; on the one hand it is the most important resource for human survival, while on the other hand it is an indispensable production resource. In addition, it is increasingly being used for leisure and recreation purposes. Striking a balance among these demands is essential. Although no serious supply problems are expected in the two parts of the country in terms of quantity, the higher quality requirements of the EC drinking water guideline in the future mean that drinking water will become a scarce commodity locally and regionally.

However, the water-supply problems in the new federal laender are significantly more pronounced than in western Germany. In particular, these areas are prone to a clearly higher incidence of pollution of surface water through the introduction of inadequately purified waste water, soil contamination from abandoned toxic waste dumps, from the low connection level to the sewerage system, and from the use of fertilizers in agriculture, as well as a reduction in the ability of the soil to regenerate itself due to contaminants introduced by precipitation.

These problems can be solved in part by the use of modern technology in eliminating contamination. However, water protection policy on the laender level in the future must have a significantly stronger preventative focus than has been the case in the past. This could mean enlarging water preserves, eliminating enforcement shortcomings in the area of indirect discharging in particular (for example, by the registration of commercial enterprises with this purpose in mind), and correspondingly structured waste water fees and a more consistent application of the cause principle. In the new federal laender, the organizational preconditions for pursuing such a policy even tend to be more favorable

than in western Germany, since the water supply enterprises in eastern Germany are also responsible for eliminating waste water.

Footnotes

1. Cf. *Data on the Environment 1988/89*, published by the Federal Environment Office, Berlin, 1988.
2. *Environmental Information From Statistics*, 1990 edition, published by Federal Office of Statistics, Wiesbaden, 1990.
3. Cf. Bernd Bartholmai, Manfred Melzer and Erika Schulz, "Private Households and Housing Demand in Germany to the Year 2000," *WOCHENBERICHT DES DIW*, No 42/90, pp. 591 ff.

Power Station Modernization Project for Eastern Germany Adopted

91MI0045A Bonn *TECHNOLOGIE-NACHRICHTEN MANAGEMENT-INFORMATIONEN* in German
19 Oct 90 pp 6-7

[Text] The environmental aspects of energy supply were largely ignored in the past in the new federal states. The furnace and power station sector must now give environmental protection measures the utmost priority in order to improve conditions, which are often catastrophic. This target must be approached on two levels: In the short term, existing power stations and furnaces can be improved and made more efficient. Only the very latest technology should be used to build new plants and replace the existing ones.

The BMFT (Federal Ministry of Research and Technology) has thus recently approved three research and development projects to this end. The project on a "Process for extracting valuable materials from the exhaust gases of lignite-fired boilers by selective dust separation using a collecting trough separator [Fanggrinnenabscheider]" sets out to demonstrate an economical desulfuration process that can be installed with the utmost speed in the lignite-fired power stations in eastern Germany. By way of comparison, the lignite-fired power stations in the new federal states emit about five million tonnes of sulfur dioxide, whereas emission of the same pollutants in the old federal states amounted to 220,000 tonnes in 1989. This underlines the urgent need to have efficient desulfuration plants available as soon as possible.

It is based on a dry desulfuration process that was originally developed in the GDR. The sulfur dioxide in the exhaust gases is bound by blowing chalk into the furnace.

The disadvantages of the process, i.e., that the amount of SO₂ bound is relatively limited and that exploitation of the chalk used is therefore poor, are overcome as follows: Water is added to the fluedust, which still contains a substantial amount of free chalk when trapped in the

electrofilter, and it is then fed back into the hot boiler exhaust gases to bind more SO_2 .

However, the high ash content restricts SO_2 binding, and the recycling of the fluedust overloads the electrofilter, with the result that too much dust is emitted and only part of the flow can be de-ashed. The ash expelled still contains so much unbound chalk that it must be discarded and cannot be used in the building industry.

This R&D project will use a "collecting trough separator" to eliminate this drawback. The collecting troughs will filter out a considerable amount of the ash, especially the chalk-free coarse ash, immediately after the boiler and before the absorber. The remaining fine ash will be allowed to through and will be fed back into the absorber to collect more SO_2 . The chalk-free ash will be drawn off and can be used in the cement industry.

The overall cost of the project is around 900,000 Deutsche marks [DM], 50 percent of which will be provided by the BMFT. The project is scheduled for completion by the middle of next year.

"Development and construction of an economical electrofilter for small heating and power stations" is the title of the second research

project, which the firm Lurgi has taken on jointly with [a company called] Environmental Engineering Clean Air Leipzig GmbH. The intention is to reduce costs by increasing the spacing between the rows of collecting electrodes from their present 400 mm to 600 mm, thus reducing the structural volume. However, this involves more than merely scaling down conventional structures. Even more attention must be paid to the special conditions prevailing in the heating and power stations in eastern Germany and the coal used.

The project has a DM2.6 million budget, and it too is 50 percent subsidized by the BMFT.

Much has already been achieved with the remedial measures that the FRG has taken to reduce sulfur and nitric oxide levels. However, further improvements will be possible when the next generation of power stations, the "combined power stations with integrated coal gasification," enter service. These stand out for their higher efficiency, lower fuel consumption, and lower pollutant emissions.

Planning work for a power station of this type has been under way since the middle of 1988. By the end of this year the work will have reached a stage where a decision can be taken to build a prototype power station in one of the new federal states. The work that has now been approved focuses on concrete site prospecting.

A coal gasification process developed in the [former] GDR and operated on a pilot scale will be used. The major advantage of this process is that it is designed specifically for the lignite used in eastern Germany, for whose use an environment-friendly process is particularly important.

This concept increases the efficiency of the power station by about 40 percent when lignite is used, 25 percent higher than the average power station running in the former GDR. These plants will reduce environmental pollution to a negligible level compared with those now in existence. If hard coal is used, efficiency can be increased to 43 percent, which also represents an improvement of almost 25 percent on the current situation in the former GDR.

ITALY

Deputies Propose Energy, Climate Research Program

91WNO165A Rome L'ESPRESSO in Italian 25 Nov 90 p 41

[Article by Enrico Arosio: "A New Climate"—first paragraph is L'ESPRESSO introduction]

[Text] Greenhouse effect—An innovative law proposal presented to the Chamber asking for the creation of a national energy program.

The greenhouse effect and the changes in the climatic equilibrium of the earth are global problems. The last confirmation comes from the very recent World Conference on Climate held in Geneva. However, is the international scientific debate unanimous regarding the causes and consequences of the progressive overheating of the earth's atmosphere? No Sir. On the contrary, there's still a lot of work to be done. Thus, can a country like Italy, rich, "hypermotorized," great consumer of fossil fuels but still backward when it comes to environmental protection, permit itself not to contribute to the international discussion? Certainly not.

But now, set in motion by the president of ENEA [Italian Committee for Research and Development of Nuclear and Alternative Energies], Umberto Colombo, with the unofficial backing of Minister of the University Antonio Ruberti, four Republican deputies, and the first signatory, Milanese parliamentarian Gerolamo Pellicano, the proposal of an innovative law for the creation of a national program for energy and global climate has been presented to the Chamber.

It deals, as it did for the Antarctic Project, with a program of scientific and technological research of strategic importance. The political coordination would fall to the Ministry of Industry; the scientific direction and financial management to ENEA: 80 billion lire available on a three-year, renewable basis.

For our country this would mean a turning point. "Because Italy," says Pellicano, "is up to now the only one of the major industrial powers not to have of a national program of this type." We would also pull more weight on an international level when it comes to defining the common prevention policies in which

supranational organizations like the UN and the EEC have invested considerable effort.

In this regard, the agreement arrived at in Luxembourg at the end of October by the EEC, speaks loud and clear: The member countries must undertake to stabilize the emissions of carbon dioxide (responsible for over 50 percent of the greenhouse effect) at 1990 levels before the year 2000. A difficult objective to attain, especially for Italy whose energy policy is enormously unbalanced and where a rethinking of nuclear energy, theorized by several political parties from the DC (Christian-Democratic Party) to the PRI [Italian Republican Party], already clashes with the natural gas option put forward by the Socialists.

Moreover, the National Energy Plan, as Minister of the Environment Giorgio Ruffolo has repeatedly stated, must be urgently reviewed, and the Republicans don't hide their desire to reduce the consumption of "dirty" combustibles in favor of the "safe atom".

In the proposal by Pellicano and his colleagues to the Ministry of Industry, in accordance with the Ministries of Environment and the University, a consulting committee would be created in which, besides the minister of foreign affairs, the ENEA, the CNR [National Research Council], the ENEL [National Electric Power Company], the Italian Space Agency and the Meteorological Service of the Air Force would take part.

The Global Climate program would emphasize in the first place a climatic study of the Mediterranean basin, with the objective, as stated at ENEA, to give Italy, along with France, a sort of Mediterranean leadership in the activity of monitoring and improving the climate of a region of crucial importance. Among the modifications caused by the greenhouse effect, not only the risks of desertification, damage to agriculture, and trauma to certain ecosystems have been noted, but also the rise of the average sea level. In a country with 7,400 kilometers of coastline, concern is a must.

Salt Lakes Used To Produce Energy, Fresh Water

91WN02034 Milan PANORAMA in Italian 16 Dec 90
p 155

[Article by Luigi Bignami: "Energy from Salt"—first paragraph is PANORAMA introduction]

[Text] Fresh water, minerals, and heat can be produced in special salt lakes.

The recipe is simple: sea water treated with sunlight. After a certain time or "rest period," perfectly potable fresh water is obtained. And with the same ingredients places can be heated or cooled, hydroponics complexes supplied, mineral salts refined and separated, and electrical energy produced. The solar lake of Margherita di

Savoia (Foggia), built by Agip Petroli in collaboration with the State Monopolies, is demonstrating that all this is possible. This is a facility that is second in the world only to the Israeli facility of Bet-Ha'arava (250,000 square meters), which is already making a desalinization plant function that saves 350 tons of petroleum per year.

What is a solar lake? A Hungarian physician named Von Kalcinsky discovered it about a century ago on a cold winter day. He was walking on the ice-covered surface of Lake Medve in Transylvania when a crack opened up. He fell in but he did not suffer from exposure; the water he fell into was lukewarm if not hot (according to measurements subsequently made it reached as high as 60 degrees centigrade in some points). The little lake, which had formed on an ancient salt deposit that was partially dissolved, consisted of strata of water having a saline content gradually decreasing from bottom to top. This stratification had prevented the warm water present at the bottom of the lake from moving upwards and thus carrying the heat to the surface and losing it into the atmosphere, as happens in any body of fresh water or of uniformly salt water such as the sea.

When the salt is stratified at various depths there is a continuous accumulation of heat in the lower strata of the body of water, where the temperature may reach several tens of degrees. The highest temperature reached, which was in an artificial solar lake in New Mexico, was 105 degrees. According to Federica Zangrando of the Solar Energy Research Institute of Denver, who worked on the project, the energy obtainable from a saline pool is also very clean, because it does not require the use of the very polluting lead batteries which, for example, are necessary in photovoltaic cells to provide electricity during the night time.

In the lake of Margherita di Savoia (25,000 square meters, average depth five meters), the temperature of the water on the bottom reaches 90 degrees. Hot water is carried by pipes to a desalinator where it makes the plant function by means of its thermal energy. Subsequently, when it has "cooled" to about 60 degrees, it returns to the lake to be heated again.

For the present the plant of Margherita di Savoia is used only to train technicians and researchers in preparation for the construction of another larger lake. "With an area of not less than 500,000 square meters and not more than 1,000,000," says Carl Niesel of the physics department of Ohio State University at Columbus, one of the world's greatest experts on the subject, "it is even possible to produce electricity at competitive costs." Where? The location has not yet been officially chosen. But the scarcity of precipitation and the average amount of sunlight during the course of the year, as well as other technical considerations, make it probable that the world's largest solar lake may come into being within a few years in Sardinia, not far from Cagliari.

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